

**HEALTH CARE SERVICES FOR
CHILDREN UNDER MEDICAID**

**Health Care Services for
Children Under Medicaid**

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EXECUTIVE SUMMARY

Medicaid Management Information System (MMIS) Eligibility and Payment files were converted to formats compatible with a database management system, INFORM, developed by one of the authors (E.N.). Calculation of eligibility variables and creation of fixed field records allowed rapid tabulation and analyses of 18 months of children's Medicaid data for the State of Maryland. Descriptive data were assembled and certain suppositions about services and recipients were tested.

In many study calculations of rates the total of all enrollees ever eligible during the study year about 260,000, was used as the denominator. In contrast, for budgetary purposes the Annual report for the Medicaid Program used the monthly average number of enrollees for this purpose, a number about 60,000 less than the ever eligible figure. About 18.5% of the State's childhood population were enrolled in the Program sometime during the study year but 33% failed to receive any Medicaid services. Enrollment was quite high in some areas, e.g. in Baltimore City 27% and for nonwhite children aged 1 through 5 years 86%. Indeed, Medicaid was a very major third party payor for non-white urban populations of children.

A core population of children was identified with extended periods of eligibility amounting to an average duration of about 40 months. By the end of the study period 72,351 children were found to have been continuously eligible for Medicaid for 48 months or longer.

Payments for Medicaid services for children were disproportionately distributed in that 68.6% of annual expenditures were accounted for by 9.3% of all users of services. By age group, payments were highest for the under 1 year old age group identifying the Medicaid Program as a significant payor for fragile or sick low birthweight infants.

Inpatient care occurred more often but was of a shorter duration in rural areas. Length of eligibility was not proportionate to average number of inpatient days suggesting that a costly episode of hospitalization may have brought the child into the Program.

Private physicians were the principal providers of ambulatory care by almost 2 to 1 compared to hospital clinics or Emergency Rooms (ERs). Patients usually returned to the same ambulatory care provider. Across the State ER use was highest where few other alternatives existed in

rural areas. For the total enrolled population 42% failed to receive any Medicaid ambulatory care services during the study year.

Outside of Baltimore City 40% of children visited a private physician as their usual provider of care (UPC) while in the City only 22.8% did so. Average annual total payments for those with an OPD as their UPC were twice that for a private physician as UPC. For the OPD group the inpatient admissions rate was 177 admissions per thousand users while the rate was 116 per thousand users for the latter. Ambulatory care payments for the OPD group were almost twice those for the private physician group.

Total average payments for users of services in a hospital based Title V Children and Youth (C&Y) Project were determined for "single site users" (either the Project Clinic was used or the host hospital ER or inpatient service) and for those who used multiple provider sites in other areas of the City in addition to the C&Y Project. The importance of continuity of care was stressed to patients and parents in the C&Y Project. Payments for multiple site users were more than two-and-a-half times greater than payments for "single site users." If all 7,838 C&Y Medicaid users studied had used the single site a total savings for Medicaid of \$1,437,489 would have been realized.

At the outset of the study year on July 1, 1980 visit fees were significantly increased for private physician office visits. In comparing 6 month before and after periods a 23% increase in office visits was observed while users of office care increased by 13%. Payments per user declined by 7.9% in the "after" period.

Only 21% of enrollees made use of dental services. The availability of dental providers when examined by region appeared not to correlate with the regional proportion of dental users.

EPSDT preventive health services were provided to 5.5% of enrollees in clinics and private offices. Health Department EPSDT screens were not included in MMIS files. Average total payments for EPSDT screened users was about \$325 compared to \$470 for all users.

Extended periods of eligibility appeared to result in a reduced need for health care services as evidenced by reduced payments for care when compared to newly enrolled age mates. A significant reduction in inpatient care was observed in the extended care group.

Asthma was found to be a very costly condition among Medicaid children. In comparisons of asthmatics enrolled in Medicaid and a middle class HMO population inpatient admissions for asthma occurred far more frequently in the Medicaid group. Other measures of severity were similar for the two groups.

Indicator conditions suggested for examining quality of care issues, using data in MMIS files, included tetracycline use in young children, antibiotic use in Upper Respiratory Infections, penicillin use in those with Rheumatic Fever, perinatal morbidity examined in various subpopulations, and audiometric or tympanometric testing after Otitis Media.

These observations suggest that the original implied intent of the MMIS System to serve administrative including billing, planning and even patient care objectives could well be met with the current data sets. However, access to MMIS data both individual over multiple years and to aggregated information must be simplified and facilitated. Of all third party payors Medicaid remains one of the most economical administratively and could well justify increased support for the MMIS.

Postulating that certain patient care information potentially might improve the quality of care concurrent access to MMIS data would be essential. In addition, responding to the implications of the information would require increased case management and outreach services which are normally not available in health care settings, except in some health department or other human services agencies. Given the medical and developmental vulnerability of low income populations expansion of such linkages and services deserves much more attention.

INTRODUCTION

Every State with a Medicaid Program must have installed and operating a Medicaid Management Information System (MMIS). This is an automated system used to pay provider claims for services rendered to Medicaid recipients and to provide information required for managing and monitoring the State's Medicaid Program. Other subsystems may also be operational such as the Surveillance and Utilization Review Subsystem which is designed to assess the magnitude and quality of care provided to Medicaid recipients as well as identifying unusual events or volumes of services (1). Other reports and subsystems are designed to provide needed information to support informed decision making. These data bases tend to be quite complete in regard to capturing information for Medicaid care transactions since provider payment is based on the adequacy of reports for entry into the MMIS payment system. Inconsistencies and omissions may exist in some of these records but generally these files reflect the magnitude of services provided in a State (2).

Data included in MMIS systems tend to be quite basic, primarily including demographic, eligibility and service data such as site of service, coded diagnoses and procedures and charges. Despite the paucity of such information various investigator have urged the use of these very large data bases for health services research as it involves the Medicaid Program (3). Indeed, the economy of using already existent data files to examine health care services for large populations has been stressed by several workers (4,5,6,7,8). Consequently, the MMIS system offers an extensive data base currently maintained for administrative purposes which lends itself very effectively to certain kinds of health services research. This was particularly true in the State of Maryland where a single statewide data system existed which maintained eligibility and claims files in a single administrative billing system (9).

However, in a General Accounting Office report published in 1978 entitled "Obtainable Benefits of the Medicaid Management Information System are Not Being Realized", it was pointed out that the full potential of the systems in three states investigated were not being fully attained (3). In the original general systems design prepared by the parent agency (HEW) for development of MMIS systems an effort was made to design into the system a mechanism for identifying inconsistencies in billing for specific diagnoses, procedures and age and sex characteristics. However, at that time this potential was

not being pursued and inconsistencies among various patient characteristics were not identified or pursued (3).

The current study was designed to explore the feasibility and usefulness of analyzing the administrative data base maintained for billing and management purposes in the State of Maryland. These studies were aimed at examining the magnitude and characteristics of services provided to children under Medicaid in the State of Maryland. The studies were limited by the brief data set available for each child included in the MMIS system. Outcome measures included the utilization and cost for various services stratified by age, sex, geographic area and other characteristics. Provider status was also an important variable examined in these analyses. General goals included the following:

- To describe the utilization of health care services by children covered by the Medicaid Program;

- To explore the impact of provider continuity on utilization and cost of services;

- To compare the use of services and cost of care for an inner city population under Medicaid and for those similarly covered in a Title V Comprehensive Care Program in regard to utilization and cost of services;

- To study the impact of higher fees for private practitioners on utilization and cost of services;

- To study the influence of preventive health services on subsequent utilization;

- To identify and test various measures of quality of care which were applicable to the limited data set available in these MMIS files.

METHODOLOGY

Data Source:

Data for this study were drawn from two main sources, Maryland Medicaid Eligibility Files and Maryland Medicaid Payment Files. Information contained in both data sets is routinely collected in the Medicaid Management Information System (MMIS) by the Maryland Medical Assistance Program for monitoring eligibility, paying charges and for other administrative purposes. Additional data were obtained from the 1980 Census of Population for Maryland using published materials (10). Estimates of available medical resources throughout the State were found in the Maryland State Health Plan (11).

Eligibility Data:

Eligibility records are maintained by the Medical Assistance Program MMIS in the format presented in Figures 1 and 2. There are three different types of eligibility records - grant records, individual records and trailer records. The grant record contains family information such as the name and address of the head of the household, and financial resources. The individual record contains data pertaining to the individual Medicaid recipient, such as demographic information and history of Medicaid eligibility. The trailer record provides additional space for coding information for individuals with lengthy eligibility histories.

Each individual is identified by an 11-digit Medicaid number. The first two digits identify either the county of residence or Baltimore City. The next six digits are given to all members of the same family. The following two digits identify the year of birth, and the last digit, or "tie-breaker" is used to differentiate between two family members born during the same year.

The functions served by the eligibility files for our study purposes were:

- (1) To identify the population of children to be included in the study.
- (2) To describe Medicaid enrollment in Maryland and its subdivisions.
- (3) To provide demographic information.
- (4) To describe eligibility patterns among the study population.

Sample Selection:

Individuals included in the study population were those 20 years of age or below as of June 30, 1981 who were eligible to receive all Medicaid services at some point

MMIS record layout for eligibility system grant record

8

9

during the period between July 1, 1980 and June 30, 1981. Thus, the following cases were excluded from study:

- (1) Those with birthdates before 07/60 or after 06/81. Since year of birth is coded on the Medicaid record as a two-digit number, there was a possibility of including in our study population individuals born between July, 1860 and June, 1981. In order to exclude these cases, individuals who were receiving either Old Aged Assistance ("Category" = 01) or Medical Assistance for the Aged ("Category" = 09) were eliminated from study.
- (2) Unborn children ("Tie-breaker" = 9)
- (3) Those who were not enrolled in Medicaid during the study period (First "Begin Date" after 7/81 or last "End-Date" before 7/80).
- (4) Those only eligible for services through the Maryland Pharmacy Assistance Program ("County Code" = 99).

Study Variables:

Study variables are presented and described in Appendix A. The majority of these variables were taken directly from the original eligibility file as displayed in Figures 1 and 2. Variables in position numbers 2 through 138 of Appendix A were taken from the individual and trailer records while zip code was taken from the grant record. In addition, fifteen variables summarizing the history of Medicaid enrollment were created for each child. These variables are defined on Page 6 of Appendix A.

Medicaid Eligibility Records:

In MMIS, eligibility records for Medicaid recipients included the data outline in Appendix A. The eligibility file was maintained in recipient number order and was updated on a monthly basis. The Recipient Identification Number, ID No., (See Appendix A as previously described for record layout) consists of 11 numerals. The two characters identifying year of birth were not changed if subsequently the year of birth was found to be in error, although it was corrected in the "Date of Birth" field appearing elsewhere in the record. The original Medicaid files were sorted into County groups as well as for individuals. Generally, the same "Family Number" was maintained for a recipient as his eligibility status changed or even if his eligibility lapsed for a time. However, if the family moved to another County, a new "Family Number" was assigned.

Beginning in Position 106 of the eligibility record, a series of fields are provided which represent beginning and ending dates of eligibility as well as the financial status

category and an institutional designation if the child was institutionalized. These "buckets" were updated each time the child's eligibility status changed. The data are shown in Fields 95 through 138 of Appendix A. If a child had more than four eligibility periods, additional space was allocated to store the information. There is no limit to the number of buckets a child might have. If the eligibility status continued from the previous review period in both category and institution and that information remained the same, the ending date of the prior eligibility period was overwritten with the new expiration date of the current eligibility period.

In the first processing step eligibility records were selected if the last end date fell within or subsequent to the study period and the birth date was 1960 through 1981. In this pass the eligibility records were also converted to ASCII character codes.

In Step #2 summary variables were calculated for the eligibility files and are listed in Appendix A, Page 6. Some variables measure the characteristics of eligibility prior to July 1, 1980, the beginning of the study period. Others tabulate the eligibility experience during the 12-month period beginning July 1, 1980 through June 30, 1981.

INFORM is the data base management system written by Eliezer Naddor used in this study for formatting and tabulating data files. It is briefly described in Appendix B.

For study purposes eligibility information was stored in two different types of INFORM files, Figure 3. The first, the Master Record File, contained the information in positions 2 through 91 of Appendix A, as well as the new summary variables noted above. Each child had one Master Record. The second type of file, or Buckets File, contained information regarding individual Medicaid enrollment periods, called "buckets" described above.

Data included in the reformatted outputs from the INFORM system are displayed in Figure 3 which shows a listing of the variables included in the INFORM system for County 20, Talbot County. File 20LO contains the Master Records, and File 20LA, the Bucket Records. Medicaid enrollment information for a child is presented in Figures 4 and 5. The first is a black female, born in June, 1967, who had been enrolled in the Medicaid Program for a total of 99 months before the start of our main study period, which began in July, 1980. She had been enrolled continuously during our study period, by virtue of being categorically

FIGURE 3

INFORM System Master Record including calculated eligibility variables and the Eligibilities Record of sequential enrollment period "buckets".

FIELDS OF FILE 20LO--CHILDREN

FD HEAD	TYPE	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
4 HOSPITAL	ALP	3	Required	4	2	8
5 INSURANCE	TEX	1	Required	5	1	9
6 DOBIRTH	NUM	4	Required	6	2	11
7 RACE	COD	1.009	Required	7	1	12
8 SEX	COD	1.003	Required	8	1	13
9 CAN REASON	TEX	1	Optional	9	1	14
10 DOEND	NUM	4	Required	10	2	16
11 PREPAY CODE	TEX	1	Optional	11	1	17
12 ZIP-CODE	NUM	5	Optional	12	4	21
13 ELIGIBILITIES	NUM	2	Form	13	2	23
14 TTIME	COD	1.255	Required	14	1	24
15 TMONTHS	COD	1.255	Required	15	1	25
16 TELIGIBS	COD	1.099	Required	16	1	26
17 NMONTHS	COD	1.006	Required	17	1	27
18 SMONTHS	COD	1.012	Required	18	1	28
19 GMONTHS	COD	1.012	Required	19	1	29
20 HMONTHS	COD	1.012	Required	20	1	30
21 SPERIODS	COD	1.012	Required	21	1	31
22 HPERIODS	COD	1.012	Required	22	1	32
23 IMONTHS	COD	1.006	Required	23	1	33
24 IYEAR	COD	1.012	Required	24	1	34
25 CINDIVIDUAL	COD	1.012	Required	25	1	35
26 MINDIVIDUAL	COD	1.012	Required	26	1	36

FIELDS OF FILE 20LA--ELIGIBILITIES

FD HEAD	TYPE	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.003	Required	3	1	6
4 CTEGRY	COD	0.099	Required	4	1	7
5 INSTITUTION	TEX	1	Required	5	1	8
6 DOSTART	NUM	4	Required	6	2	10
7 DOFINISH	NUM	4	Required	7	2	12
8 LMONTHS	COD	1.255	Required	8	1	13

FIGURE 4

Sample Master Record of eligibility information.

CASE-NUMBER	:	20003504
BYEAR	:	67
TIE	:	0
HOSPITAL	:	
INSURANCE	:	
DOBIRTH	:	6706
RACE	:	2
SEX	:	2
CAN REASON	:	
DOEND	:	8201
PREPAY CODE	:	
ZIP-CODE	:	21601
ELIGIBILITIES	:	02
TTIME	:	99
TMONTHS	:	99
TELGIBS	:	2
KMONTHS	:	6
SMONTHS	:	12
GMONTHS	:	12
HMONTHS	:	12
SPERIODS	:	1
HPERIODS	:	1
IMONTHS	:	0
IYEAR	:	0
CINDIVIDUAL	:	12
RINDIVIDUAL	:	0

FIGURE 5

Sample Eligibilities Record with two "buckets".

CASE-NUMBER	:	20003504
BYEAR	:	67
TIE	:	0
CTEGRY	:	39
INSTITUTION	:	1
DOSTART	:	7204
DOFINISH	:	7601
LMONTHS	:	46

CASE-NUMBER	:	20003504
BYEAR	:	67
TIE	:	0
CTEGRY	:	2
INSTITUTION	:	1
DOSTART	:	7602
DOFINISH	:	8201
LMONTHS	:	72

indigent. Historically, she had had two eligibility periods, one beginning in April, 1972 and ending in January, 1976 and the other beginning in February, 1976 and continuing through January, 1982. Although there was no lapse in eligibility, this child had two "buckets" since her Medicaid status changed from Medically Indigent to Categorically Indigent in February, 1976.

Study Population:

Figure 6 shows a tabulation of record types obtained from the eligibility tapes. A total of 1,276,203 records were examined from which 285,401 children and 717,572 corresponding buckets were found to be eligible for inclusion in our study.

Upon inspection of the completed eligibility records, it became evident that a number of children had eligibility start dates which preceded their birth dates. The magnitude of this problem is presented in Figure 7 showing an error rate for the State of 1.8%, ranging from a low of 0.6% in Howard County to a high of 3.5% in Allegany County. A total of 5,221 children were affected. Since most of the errors were minimal, we chose not to exclude all of these cases from the study population. We remedied the problem in the following manner, speculating that such errors were much more likely to affect our findings if the date of birth occurred during our study period:

- (1) **Date of Birth on or after January 1, 1980:** All cases in which the start date of the first bucket was more than one month earlier than the date of birth were excluded from study (N=526). If the start date of the first bucket was within one month of the birth date, this start date was changed to correspond with the date of birth (N=341). Adjustments were made in the remaining variables affected by this change.
- (2) **Date of Birth before January 1, 1980:** All cases in which the start date of the first bucket was more than six months earlier than the date of birth were excluded from study (N=463). If the start date of the first bucket was within six months of the date of birth, the start date was changed according to the following rules:
 - (A) If the date of birth fell within the first bucket, the start date of this bucket was changed to correspond with the date of birth (N=3697).
 - (B) If the date of birth did not fall within the first bucket, all buckets were excluded until the first

FIGURE 6

MEDICAID ELIGIBILITY TAPES
CONTENTS AND EXTRACTED INFORMATION

Tape	Total Records	Eligible Records			County Totals		
		File	Children	Eligible	Children	Eligible	County
1A	113,379	011	4,718	14,675	4,718	14,675	01
		021	5,088	18,123			
		022	12,205	25,917	17,293	44,040	02
		031	1,678	5,922			
1B	87,267	032	13,721	32,702			
		033	3,363	4,872			
2A	125,359	034	99	149	18,861	43,645	03
		041	2,904	9,850	2,904	9,850	04
		051	1,895	5,500	1,895	5,500	05
		061	2,983	8,061	2,983	8,061	06
		071	4,345	16,323	4,345	16,323	07
		081	5,042	15,985	5,042	15,985	08
		091	2,706	9,056	2,706	9,056	09
		101	3,059	9,817			
2B	88,049	102	639	1,062	3,698	10,879	10
		111	2,085	8,275	2,085	8,275	11
		121	7,406	21,539	7,406	21,539	12
		131	2,274	5,168	2,274	5,168	13
		141	1,054	3,143	1,054	3,143	14
		151	3,332	13,850			
3A	125,320	152	10,882	26,192	14,214	40,042	15
		161	10,313	32,702			
		162	929	2,306	11,242*	35,008*	161
3B	87,959	163	16,406	32,702			
		164	4,648	6,535			
4A	109,790	165	784	976	21,838*	40,213*	162
		171	1,535	4,388	1,535	4,388	17
		181	3,446	10,532	3,446	10,532	18
		191	1,930	6,715	1,930	6,715	19
		201	1,214	3,356	1,214	3,356	20
		211	4,678	16,150	4,678	16,150	21
		221	4,990	15,959	4,990	15,959	22
		231	268	994			
4B	103,177	232	1,673	3,916	1,941	4,910	23
		301	12,927	32,701			
		302	10,652	27,087	23,579*	59,788*	301
5A	125,100	303	12,124	32,701			
		304	11,539	32,703	23,663*	65,404*	302
		305	8,246	22,582			
5B	89,136	306	12,760	32,702	21,006*	55,284*	303
		307	7,282	17,991			
6A	125,080	308	16,270	32,701			
		309	3,830	8,282	27,382*	58,974*	304
6B	88,084	310	16,632	32,702			
		311	2,822	5,298	19,454*	38,000*	305
7A	108,503	312	19,446	32,282			
		313	6,579	14,428	26,025*	46,710*	306
		-----	-----	-----	-----	-----	-----
	1,276,203		285,401	717,572	285,401	717,572	

FIGURE 7

Errors in Eligibility Records by HSA

	# Cases,	# Errors (%)
WMHSA	15,179	375 (2.5)
Allegany	4,718	166 (3.5)
Frederick	3,698	44 (1.2)
Garrett	2,085	58 (2.8)
Washington	4,678	107 (2.3)
MCHSA	14,214	385 (2.7)
SMHSA	44,472	821 (1.8)
Calvert	2,904	40 (1.4)
Charles	5,042	120 (2.4)
Prince George's	33,080	582 (1.8)
St. Mary's	3,446	79 (2.3)
CMHSA	48,817	612 (1.2)
Anne Arundel	17,293	251 (1.2)
Baltimore County	18,861	203 (1.1)
Carroll	2,983	60 (2.0)
Harford	7,406	85 (1.1)
Howard	2,274	13 (0.6)
ESHSA	21,610	389 (1.8)
Caroline	1,895	31 (1.6)
Cecil	4,345	72 (1.6)
Dorchester	2,706	62 (2.3)
Kent	1,054	36 (3.4)
Queen Anne's	1,535	16 (1.0)
Somerset	1,930	36 (1.9)
Talbot	1,214	40 (3.3)
Wicomico	4,990	76 (1.5)
Worcester	1,941	20 (1.0)
Baltimore City	141,109	2,639 (1.9)
TOTAL	285,401	5,221 (1.8)

containing the date of birth was found. If start date of this bucket was before the date of birth, the start date was changed to correspond with the date of birth (N=194).

In both cases, adjustments were made to the variables affected by these changes.

A total of 989 cases, representing 0.3% of the original sample, were therefore excluded from the study population as being too unreliable for use. Modifications were made to the 4,232 cases, or 1.5% of the original sample, in which the errors were judged to be less problematic. Therefore, our final sample was made up of a total of 284,412 children.

Payment Data:

Payment records are maintained by the Medical Assistance Program in the format presented in Figure 8. There are three different types of payment records - Base records, Service records and Pharmacy records. Base records contain demographic data, information pertaining to the type of service provided, diagnoses, charges and payments. Service records contain more detailed information about the type of medical care received by the patient. Included in the pharmacy records is information regarding the type, quantity and cost of prescription medications.

For the purposes of budget accountability within each fiscal year, the Medical Assistance Program maintains its payment records by the date payment is made to the provider, rather than the date service is received by the patient. Thus, a service provided during FY 1981 may be included in FY 1982 payment files. According to Medicaid officials, approximately 95% of payments to providers are made within six months of the service date. Claims not paid within this period of time tend to be inadequately prepared vouchers which have been returned to the provider who often fails to take any further action. The magnitude of these absent records is unknown but is estimated to be very small.

Since the study required payment records with service dates falling between January 1, 1980 and June 30, 1981, we obtained from Medicaid all files with payment dates between January 1, 1980 and December 31, 1981. Since this time period included one full fiscal year and half of two other fiscal years, the data were divided into three groups of tapes. The first set of five tapes contained information on payments made between January and June, 1980, the second half of FY 1980. The second set of 10 tapes represented payments made during FY 1981, while the third set of five

[illegible]

Record layout of MMIS Payments Records including Base, Other Services and Pharmacy Records.

tapes included information on payments made between July and December of 1981, or the first half of FY 1982. From these tapes, data were extracted for services received during the study period.

Sample Selection:

As was done with the eligibility data, the following individual payment records were eliminated from the study population:

- (1) Those pertaining to individuals born before 1960 or after 1981.
- (2) Those involving unborn children.
- (3) Those associated with services received before January 1, 1980 or after July 1, 1981.

Variables which were not needed for study purposes were also excluded from the files. Appendix C lists payment variables all of which were taken directly from the original Medicaid files included in the study.

Preparation of Files for Payment Data:

After converting the data on the 20 payment tapes from 6250 b.p.i. to 800 b.p.i., changing the coding scheme from EBCDIC to ASCII and selecting eligible records, data from each of the original 20 tapes were copied onto three new tapes, each representing a separate record type (base, service or pharmacy). Figure 9 tabulates the record types extracted from each of the original tapes. Of the nearly 11 million records contained in these tapes, 2,188,202 base records, 2,689,865 service records and 666,628 pharmacy records were found to meet our selection criteria.

Three groups of records were received from the Medicaid Agency aggregated for 12 month fiscal year periods by date of payment, Step 1.

Group "A" files contained records whose payment dates included January 1, 1980 through June 30, 1980, Group "B" July 1, 1980 through June 30, 1981 and Group "C" July 1, 1981 through December 31, 1981.

In processing Step 2 the Medicaid files were converted to ASCII character codes and records needed for the subsequent analyses were copied to another file. Using the "Date of Birth" field individuals with dates between 1960 and 1981, and whose "Service Dates" included January 1, 1980 through June 30, 1981 were selected. Packed numeric fields were unpacked, required data identified and Base, Service and Pharmacy records written to separate files. After selection of study records and data the original 20 tapes received from the Medicaid Agency were copied onto other tapes representing separate files for "Base", "Service" and

FIGURE 9

MEDICAID PAYMENT TAPES
CONTENTS AND EXTRACTED INFORMATION

Tape	Number of Records Read	Number of Records Selected		
		BASE	SERVICE	PHARMACY
01	566,935	113,145	123,766	45,544
02	559,648	109,438	126,477	43,186
03	562,585*	106,342	123,447	34,341
04	560,311	109,528	118,862	35,883
05	357,438	70,934	78,291	23,010
06	561,794	149,524	181,750	52,511
07	558,956	155,474	194,500	54,041
08	558,596	144,727	185,882	49,660
09	546,477	154,518	221,373	50,430
10	569,248	126,430	159,726	38,700
11	563,817	162,258	201,715	43,276
12	556,975	138,611	166,231	37,457
13	555,043	166,976	196,212	47,422
14	559,674	204,046	247,069	58,015
15	174,934	0	0	0
16	533,690	43,422	58,755	8,647
17	562,200	34,948	47,276	6,948
18	562,585*	34,814	49,561	7,738
19	548,609	44,386	72,046	11,600
20	560,479	39,769	58,014	10,328
10,658,906*		2,188,202	2,689,865	666,628

* Approximate figure

"Pharmacy" records. Records reflecting payment during the three different Fiscal Year periods were still separated into three files.

In the next Processing Step, No. 3, all Base, Service and Pharmacy records from the three different fiscal year groupings were merged for an individual by County. At the same time, National Drug Codes (NDC) identifying medications in the Pharmacy records were converted to a "Drug Class", Figure 10. The National Drug Code is a 10-digit number assigned by the Food and Drug Administration. Based on categories in the "AMA Drug Evaluation" publications, the many thousands of NDC codes have been clustered into 95 general therapeutic or pharmacological groups which characterize their action. Tape files containing NDC codes with their associated drug classes were run against the pharmacy records and the Drug Codes added to these. For example, bronchodilator drugs as might be used in treating an asthmatic child were classified into the Drug Class "1940" which represents anti-asthmatics/bronchodilators in the therapeutic classification system. Where more than one drug class was assigned to an NDC, the first designation was selected. The files resulting from this processing step consisted of the sorted records for a single individual arranged by county designation. At this point, significantly incomplete records were removed, amounting to data for about 100 individuals.

In processing Step 4, the Eligibility Records for individuals in the payment files were added. Where no eligibility record existed, the payment files were removed. The majority of such cases resulted from the fact that month of birth was not included in the payment record, which meant that records of children born during 1960 or 1981, but during months which were outside the range of our study period, could not be eliminated until payment files were compared with eligibility files. Other reasons for payment records having no corresponding eligibility records were that eligibility records had been excluded due to birth date/start date errors, services were received by patients born between 1860 and 1881, there were errors in birth year, or there were errors in case numbers. For those individuals who received no services during the study period but had an Eligibility Record in the file, dummy payment records were created so that when required the denominators included all eligible recipients during the study period. Files resulting from this step represent the working data for the study arranged by county.

In processing Step 5, summary variables as outlined in Appendix C were extracted from the working files and a new

FIGURE 10

Codes for Drug Classes based on the FDA listing of National Drug Codes.

DRUG CLASSES

CODE	DRUG CLASS	CODE	DRUG CLASS
0100	ANESTHETICS AND ADJUNCTS	0915	CALORIC, ELECTROLYTIC AND WATER BALANCE
0117	ANESTHETICS, LOCAL	0916	CALCIUM METABOLISM
0118	ANESTHETICS, GENERAL	1000	HORMONES AND HORMONAL MECHANISMS
0119	ANESTHESIA, ADJUNCTS TO	1032	ADRENAL CORTICOSTEROIDS
0200	ANTAGONISTS AND ANTIDOTES	1033	ANDROGENS/ANABOLIC STEROIDS
0281	CHELATING AGENTS	1034	HORMONES/ORAL CONTRACEPTIVES/OVULATORY
0282	ANTAGONISTS, NARCOTIC	1035	ANTERIOR PITUITARY/HYPOTHALMIC HORMONES
0283	EMETICS	1036	GLUCOSE LOWERING AGENTS
0284	ANTIDOTES, MISCELLANEOUS	1037	THYROID DISEASE
0300	ANTIMICROBIALS	1038	ANTIDIURETICS
0346	PENICILLINS	1039	OXYTOCICS
0347	CEPHALOSPORINS	1100	IMMUNOLOGIC
0348	CLINDAMYCIN/LINCOMYCIN/MACROLIDES	1180	VACCINES AND ANTISERUMS
0349	POLYMYXINS	1200	LOCALLY APPLIED AGENTS
0350	TETRACYCLINES	1264	ANTISEPTICS/DISINFECTANTS
0351	CHLORAMPHENICOL/DERIVATIVES	1265	DERMATOLOGICAL AGENTS
0352	AMINOGLYCOSIDES	1300	NEUROMUSCULAR
0353	SULFONAMIDES	1371	ANTIPARKINSONISM
0354	NITROFURANS	1372	MYASTHENIA GRAVIS
0355	ANTIBACTERIAL AGENTS, MISCELLANEOUS	1373	SKELETAL MUSCLE RELAXANTS
0356	ANTIMYCOBACTERIALS	1400	ONCOLYTIC
0357	ANTILEPROSY	1479	ANTINEOPLASTIC AGENTS
0358	ANTIFUNGALS	1500	OPHTHALMOLOGIC
0388	ANTIVIRALS	1566	GLAUCOMA AGENTS
0400	BLOOD FORMATION/VOLUME/COAGULABILITY	1567	MYDRIATICS/CYCLOPLEGICS
0408	ANEMIA TREATMENT AGENTS	1568	OCULAR ANTI-INFECTION/ANTI-INFLAMMATORY
0409	ANTICOAGULANTS	1569	OPHTHALMIC, MISCELLANEOUS
0410	BLOOD/BLOOD COMPONENTS/BLOOD SUBSTITUTES	1600	OTOLOGIC
0411	HEMOSTATICS	1670	TOPICAL OTIC PREPARATIONS
0500	CARDIOVASCULAR-RENAL	1700	PAIN RELIEF AGENTS
0501	DIGITALIS GLYCOSIDES	1720	ANALGESICS, STRONG
0502	ANTIARRHYTHMICS	1721	ANALGESICS, MILD
0503	ANTIANGINALS	1722	ANALGESICS, MISCELLANEOUS
0504	PERIPHERAL/CEREBRAL VASCULAR DISORDERS	1723	ANTI-MIGRAINE
0505	HYPOTENSION AND SHOCK	1724	ANTI-GOUT, ANTI-RHEUMATIC
0506	ANTIHYPERTENSIVES	1800	PARASITICIDAL
0507	DIURETICS	1859	ANTIMALARIALS
0600	CENTRAL NERVOUS SYSTEM	1860	AMEBICIDES
0626	SEDATIVES/HYPNOTICS	1861	ANTITRICHOMONALS
0627	ANTI-ANXIETY	1862	ANTHELMINTICS
0628	ANTI-PSYCHOTIC/ANTIMANIC	1863	SCABICIDES/PEDICULICIDES
0629	ANTICONVULSANTS	1900	RESPIRATORY AND ALLERGY
0630	ANTIDEPRESSANTS	1940	BRONCHODILATORS/ASTHMA
0631	ANOREXIANTS/CNS STIMULANTS	1941	NASAL DECONGESTANTS
0700	DIAGNOSTICS AND	1942	EXPECTORANTS/INHALANTS
0789	RADIOPHARMACEUTICALS	1943	ANTITUSSIVES
0790	NON-RADIOACTIVE DIAGNOSTICS	1944	ANTIHISTAMINES
0791	RADIOACTIVE DIAGNOSTICS	1945	COLD REMEDIES
0800	RADIOPHARMACEUTICALS	1992	MEDICINAL GASES
0874	GASTROINTESTINAL	2000	UNCLASSIFIED/MISCELLANEOUS DRUGS
0875	PEPTIC ULCER	2085	URINARY TRACT STIMULANTS/RELAXANTS
0876	ANTIDIARRHEALS	2086	ENZYMES USED AS DRUGS
0877	LAXATIVES	2087	MISCELLANEOUS DRUGS
0878	GASTROINTESTINAL, MISCELLANEOUS	2093	DRUG-DEVICE CONTRACEPTIVES
0878	ANTIEMETICS	2094	REFERENCE STANDARDS
0900	HOMEOSTATIC AND NUTRIENT	2095	PHARMACEUTICAL AIDS
0912	HYPERLIPIDEMIA	2096	SURGICAL AIDS
0913	VITAMINS/MINERALS		
0914	NUTRITIONAL AGENTS		

file of study variables was created. These consisted of a master record and 9 subsidiary records for each recipient. The record variables were selected to represent those data required for addressing the study issues, Appendix B.

In processing Step 6, the files of study variables were converted to the format specified by the data base management program INFORM which was to be used for subsequent analyses. An example of these formats is given in Appendix B.

In Step 7 tabulations and analyses of data were prepared using the INFORM data base management programs operating on the files created in the previous processing step.

Summary Payment Files:

As described, payment records were used to generate "summary files" for each child. Variables contained in these files summarized the type and quantity of services received during the study period, provided information on diagnoses and existing conditions and summarized costs by type of service. These data were then linked with the information contained in the eligibility records. A listing of variables contained in the summary files is shown in Appendix B.

Figures 11 and 12 show the variables included in the base, service and pharmacy records of the INFORM system. Payment records for a sample child are presented in Figures 13 and 14. Figure 13 shows several service records for the same child whose eligibility history was described earlier. On September 9, 1980, the child made an office visit to Physician 03591, whose speciality was Internal Medicine. A diagnosis of "51" was coded, which represents "influenza/emphysema/asthma/other diseases of the respiratory system." The physician charged Medicaid \$16 for the visit; \$12 was paid. On April 4, 1981 the child visited the emergency room of Hospital 00030. The diagnosis coded was "pneumonia/bronchitis." Two services were provided at the visit, the emergency room visit itself, for which the hospital charged \$39 and received \$36, and radiology services, for which the hospital charged \$35 and was paid \$33. Figure 14 shows a pharmacy payment record for a prescription which was written on May 20, 1981 and filled on the same date. The drug, Theo-Dur, falls into the drug class 1940, or antiasthmatics/bronchodilators. The child received a 30-day supply of the drug.

FIGURE 11

Data fields in the INFORM System Base Record.

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
-4 FORM COUNT	NUM	4	Required	4	2	8
5 SPEC CODE	COD	1.040	Required	5	1	9
6 SERVICE TYPE	COD	1.008	Required	6	1	10
7 VENDOR NO.	NUM	5	Required	7	4	14
8 STATUS	ALP	5	Required	8	4	18
9 PATIENT ID	ALP	11	Optional	0	8	26
10 BATCH	TEX	1	Required	10	1	27
11 RACE	COD	1.009	Required	11	1	28
12 SEX	COD	1.003	Required	12	1	29
13 YBIRTH	COD	60.081	Required	0	1	30
14 CTEGRY	COD	0.099	Required	14	1	31
15 INSTITUTION	TEX	1	Required	15	1	32
16 STAR-DATE	DAT	8	Required	16	2	34
17 END--DATE	DAT	8	Required	17	2	36
18 D1	COD	0.255	Required	18	1	37
19 D2	COD	0.255	Optional	19	1	38
20 D3	COD	0.255	Optional	0	1	39
21 D4	COD	0.255	Optional	0	1	40
22 TYPE SERVICE	TEX	1	Required	22	1	41
23 TOT-COST	TOT	5	Required	23	4	45
24 PHAR-FEE	TOT	5	Optional	0	4	49
25 PAY-MEDICAID	TOT	5	Required	25	4	53
26 INCREMENTS	NUM	2	Form	26	2	55

FIGURE 12

Data fields in the INFORM System Service and Pharmacy Records.

FIELDS IN FILE 20PA--SERVICE RECORDS

FD	HEAD	TYF	MAX	REQUIREMENT	PR	LEN	CUM
-1	CASE-NUMBER	NUM	8	Required	1	4	4
-2	BYEAR	COD	60.081	Required	2	1	5
-3	TIE	COD	0.005	Required	3	1	6
-4	FORM COUNT	NUM	4	Required	4	2	8
5	SERVICE TYPE	COD	1.008	Required	5	1	9
6	DATE-SERV	DAT	8	Required	6	2	11
7	MODIFY PROC	COD	0.099	Optional	7	1	12
8	DAYS SERVICE	COD	0.255	Required	8	1	13
9	PROCEDURE COD	ALF	5	Required	9	4	17
10	CODE SERVICE	COD	0.099	Required	10	1	18
11	CHA-VEND	TOT	5	Required	11	4	22
12	PAY-VEND	TOT	5	Required	12	4	26

WRK:H20PA.ANC: SERVICES=H
15280 ITEMS IN 849 RECS
27 CHRS/ITE, 18 ITE/REC

Ready

FIELDS IN FILE 20PB--PHARMACY RECORDS

FD	HEAD	TYF	MAX	REQUIREMENT	PR	LEN	CUM
-1	CASE-NUMBER	NUM	8	Required	1	4	4
-2	BYEAR	COD	60.081	Required	2	1	5
-3	TIE	COD	0.005	Required	3	1	6
-4	FORM COUNT	NUM	4	Required	4	2	8
5	MANUFACTURER	NUM	5	Required	5	4	12
6	PRODUCT	TEX	4	Required	6	4	16
7	RX1	NUM	4	Optional	7	2	18
8	RX2	NUM	4	Optional	8	2	20
9	RX3	NUM	4	Optional	9	2	22
10	RX4	NUM	4	Optional	10	2	24
11	WRIT-DATE	DAT	8	Required	11	2	26
12	FILL-DATE	DAT	8	Required	12	2	28
13	DAYS SUPPLIED	COD	0.255	Required	13	1	29
14	TOT-PAID	TOT	5	Required	14	4	33

FIGURE 13

Sample records in the INFORM System of Base and Service Records.

PO		PO	
----		----	
CASE-NUMBER	: 20003504	CASE-NUMBER	: 20003504
BYEAR	: 67	BYEAR	: 67
TIE	: 0	TIE	: 0
FORM COUNT	: 2003	FORM COUNT	: 2052
SPEC CODE	: 6	SPEC CODE	: 28
SERVICE TYPE	: 1	SERVICE TYPE	: 5
VENDOR NO.	: 03591	VENDOR NO.	: 00030
STATUS	:	STATUS	:
BATCH	: 1	BATCH	: 6
RACE	: 2	RACE	: 2
SEX	: 2	SEX	: 2
CTEGRY	: 2	CTEGRY	: 2
INSTITUTION	: 1	INSTITUTION	: 1
STAR-DATE	: 80/09/17	STAR-DATE	: 81/04/23
END--DATE	: 80/09/17	END--DATE	: 81/04/23
D1	: 51	D1	: 46
D2	: 0	D2	: 0
TYPE SERVICE	:	TYPE SERVICE	: 0
TOT-COST	: 16.	TOT-COST	: 74.
PAY-MEDICAID	: 12.	PAY-MEDICAID	: 70.
INCREMENTS	: 01	INCREMENTS	: 02
PA		PA	
----		----	
CASE-NUMBER	: 20003504	CASE-NUMBER	: 20003504
BYEAR	: 67	BYEAR	: 67
TIE	: 0	TIE	: 0
FORM COUNT	: 2003	FORM COUNT	: 2052
SERVICE TYPE	: 1	SERVICE TYPE	: 5
DATE-SERV	: 80/09/17	DATE-SERV	: 81/04/23
MODIFY PROC	: 0	MODIFY PROC	: 0
DAYS SERVICE	: 1	DAYS SERVICE	: 1
PROCEDURE COD	: 90050	PROCEDURE COD	:
CODE SERVICE	: 1	CODE SERVICE	: 22
CHA-VEND	: 16.	CHA-VEND	: 35.
PAY-VEND	: 12.	PAY-VEND	: 33.
		CASE-NUMBER	: 20003504
		BYEAR	: 67
		TIE	: 0
		FORM COUNT	: 2052
		SERVICE TYPE	: 5
		DATE-SERV	: 81/04/23
		MODIFY PROC	: 0
		DAYS SERVICE	: 1
		PROCEDURE COD	:
		CODE SERVICE	: 28
		CHA-VEND	: 39.
		PAY-VEND	: 36.

FIGURE 14

Sample records in the INFORM System of Base and Pharmacy Records.

FILES 20FO AND 20PB--PAYMENT
AND PHARMACY RECORDS

CASE-NUMBER : 20003504
 BYEAR : 67
 TIE : 0
 FORM COUNT : 2041
 SPEC CODE : 23
 SERVICE TYPE : 2
 VENDOR NO. : 03562
 STATUS : 89999
 BATCH : 2
 RACE : 2
 SEX : 2
 CTEGRY : 2
 INSTITUTION : 1.
 STAR-DATE : 81/05/20
 END--DATE : 81/05/20
 D1 : 0
 D2 : 0
 TYPE SERVICE :
 TOT-COST : 0.
 PAY-MEDICAID : 9.
 INCREMENTS : 01

CASE-NUMBER : 20003504
 BYEAR : 67
 TIE : 0
 FORM COUNT : 2041
 MANUFACTURER : 00369
 PRODUCT : 0803
 RX1 : 1940
 RX2 : 0000
 RX3 : 0000
 RX4 : 0000
 WRIT-DATE : 81/05/20
 FILL-DATE : 81/05/20
 DAYS SUPPLIED : 30
 TOT-PAID : 0.

RESULTS

Calculation of Denominators for Users and Enrollees:

Table 1 is taken from the Maryland Medical Assistance Annual Report for 1981 (9). For purposes of that report, the denominators for users and enrollees are calculated by taking the average number in each category for the month and using that as the figure for the fiscal year. Consequently the annual report is based on monthly certification data. The current study is population based and looks at the entire population of children who may have been eligible or users at any time during the fiscal year under study. As displayed in Table 1, the average number of children enrolled in the program for fiscal year 1981 was 199, 205. As shown in Table 2 the total number of children enrolled in the Medicaid Program during the study year was about 260,000. In Table 1 the percentage of enrollees receiving no services was 11.9 percent. However, in the study calculations where total number of enrollees for the year are examined the percentage receiving no services is much higher as will be demonstrated in a later calculation.

Percentage of Children Enrolled in Medicaid by HSA and County:

In Table 2, 2a, and 2b, the percentage of children enrolled at any time during the year in the Medicaid Program are displayed. The total population figures for children are taken from the 1980 census of population for Maryland from the U.S. Bureau of Census (10). Overall, 18.5 percent of children in the State were enrolled in the Medicaid Program sometime during fiscal year 1981. The highest rate recorded in Baltimore City was 50.7 percent of the total child population while Howard County had the lowest rate at 4.9 percent of the total child population. Similar differences were observed by age group with 58 percent of the under 1 population enrolled in Baltimore City while for the 1-5 year old, 71.1 percent were enrolled. In most other jurisdictions the under 1 year old group had the highest percentage enrolled with somewhat similar figures for the 1-5 year group but declining percentages beyond 6 years of age. After the high rates for Baltimore City the Eastern Shore HSA had percentage enrollees, less than half of that for the City.

Table 2a is similar data for the white population while Table 2b displays the data for the non-white population. Statewide the percentage of white children enrolled in the Medicaid Program was 9.7 percent with Baltimore City at 29.4 percent. The rates for Baltimore City were almost three times those for the State as a whole.

Table 1, Maryland Medical Assistance Program Report of
Persons Receiving Services by Type and Age:
Fiscal Year 1981

Type of Service	Under 6 Yrs. No. % **	6-20 Yrs. No. % **	0-20 Yrs. No. % **
One or more types of service*	59,689 (92.3)	115,804 (86.1)	175,493 (88.1)
Hospital inpatient	7,757 (12.0)	10,831 (8.1)	18,588 (9.3)
Hospital outpatient	38,646 (59.8)	63,010 (46.8)	101,656 (51.0)
Physician	44,662 (69.0)	79,939 (59.4)	124,601 (62.5)
Pharmacy	40,693 (63.0)	65,897 (49.0)	106,590 (53.5)
Dental	6,536 (10.1)	48,772 (36.3)	55,308 (27.8)
Special Services	6,144 (9.5)	30,049 (22.3)	36,193 (18.2)
No Services	<u>5,003</u> (7.7)	<u>18,709</u> (13.9)	<u>23,712</u> (11.9)
Total in Age Group	64,692 #	134,513 #	199,205 #

* Number of persons receiving single or any combination of services. This is not the sum of the column below since many received more than one service.

** Percentage of those enrolled in the age group receiving that service type.

See text for explanation as to why these totals differ from those cited in this study.

Data Source: The Year in Review, Department of Health and Mental Hygiene: Medical Care Programs, The Division of Program Review and Planning, January, 1982.

TABLE: 2

POPULATION FROM 1980 CENSUS, NUMBER OF CHILDREN ENROLLED IN MEDICAID AND
PERCENTAGE OF CHILDREN ENROLLED IN MEDICAID BY AGE, HSA AND COUNTY, MARYLAND, FY 1981

HSA/COUNTY	<1			1-5			6-10			11-15			16-20			TOTAL		
	POP	ENR	%	POP	ENR	%	POP	ENR	%	POP	ENR	%	POP	ENR	%	POP	ENR	%
WMHSA	4,625	870	18.8	21,561	3,806	17.6	25,385	2,862	11.3	28,385	2,925	10.3	31,837	3,222	10.1	111,793	13,685	12.2
Allegany	4,955	289	30.3	4,533	1,266	27.9	5,347	933	17.4	6,378	845	13.2	8,122	972	12.0	25,335	4,305	17.0
Frederick	1,792	205	11.4	8,391	919	11.0	9,678	666	6.9	10,156	692	6.8	10,781	807	7.5	40,798	3,289	8.1
Garrett	438	107	24.4	1,983	452	22.8	2,286	404	17.7	2,495	462	18.5	2,425	394	16.2	9,627	1,819	18.9
Washington	1,440	269	18.7	6,654	1,169	17.6	8,074	859	10.6	9,356	926	9.9	10,509	1,049	10.0	36,033	4,272	11.8
CHSA	7,160	666	9.3	32,957	3,517	10.7	41,106	2,707	6.6	50,309	2,609	5.2	48,585	3,025	6.2	180,117	12,524	7.0
SMHSA	13,014	2,500	19.2	58,575	11,433	19.5	67,862	8,501	12.5	78,667	8,498	10.8	88,102	8,879	10.1	306,220	39,811	13.0
Calvert	592	142	24.0	2,718	648	23.8	3,085	495	16.0	3,652	628	17.2	3,690	677	21.9	13,137	2,590	19.7
Charles	1,249	254	20.3	5,905	1,183	20.0	7,209	855	11.9	8,362	1,022	12.2	7,306	1,236	16.9	30,031	4,550	15.2
Prince George's	10,059	1,928	19.2	45,408	8,775	19.5	52,132	6,507	12.5	60,690	6,159	10.1	71,194	6,212	8.7	239,123	29,581	12.4
St. Mary's	1,114	176	15.8	4,904	827	16.9	5,436	644	11.8	5,963	689	11.6	6,512	754	11.6	23,929	3,090	12.9
CMHSA	18,299	2,341	12.8	84,299	12,257	14.5	100,143	9,739	9.7	119,857	9,395	7.8	130,524	9,893	7.6	453,122	43,625	9.6
Anne Arundel	5,267	903	17.1	24,621	4,281	17.4	28,457	3,317	11.6	32,965	3,282	10.0	37,229	3,489	9.4	128,539	15,272	11.9
Baltimore Co.	7,930	845	10.6	34,748	4,870	14.3	41,181	3,923	9.5	51,637	3,666	7.1	59,733	3,762	6.3	195,229	17,166	8.8
Carroll	1,343	157	11.7	6,481	706	10.9	7,893	533	6.8	9,110	550	6.0	8,712	639	7.3	33,539	2,585	7.7
Harford	2,071	294	14.2	10,229	1,781	17.4	12,623	1,542	12.2	14,439	1,484	10.3	14,866	1,479	9.9	54,228	6,580	12.1
Howard	1,688	142	8.4	8,220	519	6.3	9,989	424	4.2	11,706	413	3.5	9,984	524	5.2	41,587	2,022	4.9
ESHSA	4,009	1,265	31.6	18,804	5,658	30.1	21,046	4,124	19.6	25,107	3,876	15.4	27,747	4,367	15.7	96,713	19,290	19.9
Caroline	297	110	37.0	1,616	524	32.4	1,751	357	20.4	2,028	343	16.9	2,029	333	16.4	7,721	1,667	21.6
Cecil	847	209	24.7	4,282	1,079	25.2	5,262	872	16.6	5,965	801	13.4	5,915	945	16.0	22,271	3,906	17.5
Dorchester	392	161	41.1	1,782	659	37.0	2,080	537	25.8	2,507	515	20.5	2,512	556	22.1	9,273	2,428	26.2
Kent	203	62	30.5	926	268	28.9	1,051	191	18.2	1,251	205	16.4	1,791	191	10.7	5,222	917	17.6
Queen Anne's	347	92	26.5	1,691	404	23.9	1,768	264	14.9	2,154	273	12.7	2,218	329	14.8	8,178	1,332	16.6
Somerset	263	119	45.2	1,232	475	38.6	1,307	346	26.5	1,529	351	23.0	2,079	400	19.2	6,410	1,691	26.4
Talbot	287	88	30.7	1,314	302	23.0	1,515	210	13.9	1,978	222	11.2	2,067	267	12.9	7,161	1,089	15.2
Wicomico	937	288	30.7	4,136	1,424	34.4	4,383	1,006	23.0	5,170	841	16.3	6,469	964	14.9	21,095	4,523	21.4
Worcester	436	136	31.2	1,825	523	28.6	1,929	341	17.7	2,525	325	12.9	2,667	382	14.3	9,382	1,707	18.2
Baltimore City	11,636	6,747	58.0	50,213	35,715	71.1	54,359	28,853	53.1	65,602	28,390	43.3	77,112	31,505	40.8	258,922	131,210	50.7
TOTAL	58,743	14,389	24.5	266,409	72,386	27.2	309,901	56,786	18.3	367,927	55,693	15.1	403,907	60,891	15.1	1,406,887	260,145	18.5

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TABLE: 2a POPULATION FROM 1980 CENSUS, NUMBER OF CHILDREN ENROLLED IN MEDICAID AND
PERCENTAGE OF CHILDREN ENROLLED IN MEDICAID BY AGE, HSA AND COUNTY. WHITES, MARYLAND, FY 1981.

HSA/COUNTY	<1			1-5			6-10			11-15			16-20			TOTAL		
	POP	ENR MED	% MED	POP	ENR MED	% MED	POP	ENR MED	% MED	POP	ENR MED	% MED	POP	ENR MED	% MED	POP	ENR MED	% MED
WMHSA	4,387	774	17.6	20,485	3,293	16.1	24,256	2,526	10.4	27,149	2,587	9.5	29,705	2,850	9.6	105,982	12,030	11.4
Allegany	933	277	29.7	4,411	1,210	27.4	5,208	880	16.9	6,255	798	12.8	7,846	936	11.9	24,653	4,101	16.6
Frederick	1,661	156	9.4	7,801	640	8.2	8,995	482	5.4	9,386	510	5.4	9,952	589	5.9	37,795	2,377	6.3
Garrett	433	105	24.2	1,966	448	22.8	2,275	401	17.6	2,478	455	18.4	2,388	388	16.2	9,940	1,797	18.8
Washington	1,360	236	17.4	6,307	995	15.8	7,778	763	9.8	9,030	824	9.1	9,519	937	9.8	33,994	3,755	11.0
MCHSA	5,703	334	5.8	26,129	1,747	6.7	33,246	1,226	3.7	42,121	1,170	2.8	41,235	1,439	3.5	148,434	5,916	4.0
SMHSA	7,239	861	11.9	32,292	4,090	12.7	36,869	2,790	7.6	44,486	2,730	6.1	56,103	3,217	5.7	176,989	13,688	7.7
Calvert	470	60	12.8	2,116	247	11.7	2,315	222	9.6	2,552	229	9.0	2,031	247	12.2	9,484	1,005	10.6
Charles	979	115	11.7	4,704	511	10.9	5,587	332	5.9	6,142	334	5.4	5,234	478	9.1	22,646	1,770	7.8
Prince George's	4,864	612	12.6	21,416	2,907	13.6	24,539	1,941	7.9	31,226	1,887	6.0	43,773	2,179	5.0	125,818	9,526	7.6
St. Mary's	926	74	8.0	4,056	425	10.5	4,428	295	6.7	4,566	280	6.1	5,065	313	6.2	19,041	1,387	7.3
CMHSA	15,675	1,542	9.8	72,485	8,256	11.4	86,523	6,622	7.6	104,639	6,518	6.2	114,941	6,985	6.1	394,263	29,923	7.6
Anne Arundel	4,420	540	12.2	20,803	2,621	12.6	24,266	2,087	8.6	28,082	1,995	7.1	31,657	2,147	6.8	109,228	9,390	8.6
Baltimore CO.	6,730	575	8.5	29,435	3,433	11.7	35,078	2,671	7.6	45,116	2,679	5.9	53,696	2,892	5.4	170,055	12,250	7.2
Carroll	1,297	132	10.2	6,286	620	9.9	7,615	485	6.4	8,773	493	5.0	8,347	554	6.6	32,318	2,284	7.1
Harford	1,818	214	11.8	9,033	1,283	14.2	11,259	1,121	10.0	12,983	1,115	8.6	12,893	1,078	8.4	47,906	4,811	10.0
Howard	1,410	81	5.7	6,928	299	4.3	8,305	258	3.1	9,685	236	2.4	8,348	314	3.8	34,676	1,188	3.4
ESHSA	3,022	599	19.8	14,382	2,716	18.9	16,197	2,060	12.7	18,998	1,869	9.8	20,634	2,236	10.8	73,233	9,480	12.9
Caroline	231	67	29.0	1,319	278	21.1	1,400	218	15.6	1,605	167	10.4	1,610	174	10.8	6,165	904	14.7
Cecil	802	180	22.4	4,058	938	23.1	4,985	777	15.6	5,618	706	12.6	5,085	820	16.1	20,548	3,421	16.6
Dorchester	247	48	19.4	1,084	154	14.2	1,237	131	10.6	1,545	133	8.6	1,586	160	10.1	5,699	626	11.0
Kent	157	29	18.5	688	132	19.2	766	89	11.6	892	103	11.5	1,370	93	6.8	3,873	446	11.5
Queen Anne's	278	45	16.2	1,409	201	14.3	1,513	142	9.4	1,751	145	8.3	1,777	185	10.4	6,728	718	10.7
Somerset	161	33	20.5	729	155	21.3	762	116	15.2	843	108	12.8	1,003	153	15.2	3,498	565	16.2
Talbot	207	36	17.4	992	113	11.4	1,095	74	6.8	1,442	72	5.0	1,556	103	6.6	5,292	398	7.5
Wilcomco	651	113	17.4	2,953	555	18.8	3,156	404	12.8	3,714	323	8.7	4,900	404	8.2	15,374	1,799	11.7
Worcester	288	48	16.7	1,150	190	16.5	1,283	109	8.5	1,588	112	7.0	1,747	144	8.2	6,056	603	10.0
Baltimore City	3,941	1,308	33.2	16,759	6,938	41.4	17,120	5,460	31.9	19,960	5,370	31.9	26,251	5,712	21.8	84,031	24,788	29.4
TOTAL	39,967	5,418	13.6	182,532	27,040	14.8	214,211	20,684	9.6	257,353	20,244	7.9	288,869	22,439	7.8	982,932	95,825	9.7

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TABLE: 2b

POPULATION FROM 1980 CENSUS, NUMBER OF CHILDREN ENROLLED IN MEDICAID AND PERCENTAGE OF CHILDREN ENROLLED IN MEDICAID BY AGE, HSA AND COUNTY. NON-WHITES, MARYLAND, FY 1981.

HSA/COUNTY	< 5			1-5			6-10			11-15			16-20			TOTAL		
	POP	ENR MED	ENR MED	POP	ENR MED	ENR MED	POP	ENR MED	ENR MED	POP	ENR MED	ENR MED	POP	ENR MED	ENR MED	POP	ENR MED	ENR MED
WMHSA	238	96	40.3	1,076	513	47.7	1,129	336	29.8	1,236	338	27.3	2,132	372	17.4	5,811	1,655	28.5
Allegany	22	12	54.5	122	56	45.9	139	53	38.1	123	47	38.2	276	37	13.0	682	204	29.9
Frederick	131	49	37.4	590	279	47.3	683	184	26.9	770	182	23.6	829	218	26.3	3,003	912	30.4
Garrett	5	2	40.0	17	4	23.5	21	3	14.3	17	7	41.2	37	6	16.2	87	22	25.3
Washington	80	33	41.2	347	174	50.1	296	96	32.4	326	102	31.3	990	112	11.3	2,039	517	25.4
MCHSA	1,457	332	22.8	6,828	1,770	25.9	7,860	1,481	18.8	8,188	1,439	17.6	7,350	1,586	21.6	31,683	6,608	20.8
SNHSA	5,775	1,639	28.4	26,283	7,343	27.9	30,993	5,711	18.4	34,181	5,768	16.9	31,999	5,662	17.7	129,231	26,123	20.2
Calvert	122	82	67.2	602	401	66.6	770	273	35.4	1,100	399	36.3	1,059	430	40.6	3,653	1,585	43.4
Charles	270	139	51.5	1,201	672	56.0	1,622	523	32.2	2,220	688	31.0	2,072	758	36.6	7,385	2,780	37.8
Prince George's	5,195	1,316	25.3	23,632	5,868	24.8	27,593	4,566	16.5	29,464	4,272	14.5	27,421	4,033	14.7	113,305	20,055	17.7
St. Mary's	188	102	54.2	848	402	47.4	1,008	349	34.6	1,397	409	29.3	1,447	441	30.5	4,888	1,703	34.8
CHHSA	2,624	799	30.4	11,814	4,001	33.9	13,620	3,117	22.9	15,218	2,877	18.9	15,583	2,908	18.7	58,859	13,702	23.3
Anne Arundel	847	363	42.8	3,818	1,660	43.5	4,191	1,230	29.2	4,903	1,287	26.4	5,572	1,342	24.1	19,311	5,882	30.4
Baltimore Co.	1,200	270	22.5	5,313	1,537	28.9	6,103	1,252	20.5	6,521	990	15.1	6,037	870	14.4	25,174	4,916	19.5
Carroll	46	25	54.3	195	86	44.1	278	48	17.3	337	57	16.9	365	85	23.3	1,221	301	24.6
Harford	253	80	31.6	1,196	498	41.6	1,364	421	30.9	1,456	369	25.3	1,973	401	20.3	6,242	1,769	28.3
Howard	278	61	21.9	1,292	220	17.0	1,684	166	9.8	2,021	177	8.8	1,636	210	12.8	6,911	834	12.1
ESHSA	987	666	67.5	4,422	2,942	66.5	4,849	2,064	42.6	6,109	2,007	32.8	7,113	2,131	30.0	23,480	9,810	41.8
Caroline	66	43	65.2	297	246	82.8	351	139	39.6	423	176	41.6	419	159	37.9	1,556	763	49.0
Cecil	45	29	64.4	224	141	62.9	277	95	34.3	347	95	27.4	380	125	15.1	1,723	485	28.1
Dorchester	145	113	77.9	698	505	72.3	843	406	48.2	962	382	39.7	926	396	42.6	3,574	1,802	50.4
Kent	46	33	71.7	238	136	57.1	285	102	35.8	359	102	28.4	421	98	23.3	1,349	471	34.9
Queen Anne's	69	47	68.1	282	203	72.0	255	122	47.8	303	128	42.1	441	144	32.6	1,450	644	44.4
Somerset	102	86	84.3	503	320	63.6	545	230	42.2	686	243	35.4	1,076	247	22.9	2,912	1,126	38.7
Talbot	80	52	65.0	322	189	58.7	420	136	32.4	536	150	28.0	511	164	32.1	1,869	691	37.0
Wicomico	286	175	61.2	1,183	869	73.4	1,227	602	49.1	1,456	518	35.6	1,569	560	35.7	5,721	2,724	47.6
Worcester	148	88	59.4	675	333	49.3	646	232	35.9	937	213	22.7	920	238	25.9	3,326	1,104	33.2
Baltimore City	7,695	5,439	70.7	33,454	28,777	86.0	37,239	23,393	62.8	45,642	23,020	50.4	50,861	25,793	50.7	174,891	106,422	60.8
TOTAL	18,776	8,971	47.8	83,877	45,346	54.1	95,690	36,102	37.7	110,574	35,449	32.0	115,038	38,452	33.4	423,955	164,320	38.8

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For the non-white population displayed in Table 2b, the overall percentage for the State was 38.8 percent. In Baltimore City, 60.8 percent of the total child population was enrolled in the Medicaid Program at some time during the study year. For the under 1 year old in Baltimore City, 70.7 percent were enrolled while those aged 1-5 years of age, 86 percent were enrolled. The Eastern Shore HSA showed a percentage of the non-white population enrolled at 41.8 percent with similarly high percentages for the under 1 group, 67.5 percent and the 1-5 year old group, 66.5 percent. The smallest percentage at 17.7 percent enrolled in the Medicaid Program was seen in Prince George's County. The lowest percentage of the non-white children enrolled was seen in Howard County where the figure was 12 percent. In both Tables 2a and 2b, the population aged 5 years and under generally demonstrated the highest enrollment rates in the Medicaid Program.

Inventory of Ambulatory Care Health Services:

Table 3 is a copy of ambulatory health care services assembled in the Maryland Preliminary State Health Plan published in 1979 (11). Only Baltimore City has children and youth clinics which are federally funded primary care facilities. Hospital outpatient clinics are also concentrated in the Central Maryland, Baltimore City area. In Table 4 the calculation of persons per square mile suggests something about the accessibility of health care services. On the Eastern Shore and in Western Maryland the population density is much lower suggesting greater inaccessibility of medical care and consequent obstacles to obtaining such care. The physician population ratio is also presented in Table 4 with general practitioners or family practitioners calculated for total population while pediatricians are calculated on the basis of the child population. The high ratio of general practitioners to population in the Central Maryland and Baltimore City area is probably offset by the larger number of alternative sources of care in these areas. The availability of medical resources in the various HSAs is not expected to influence the percentage enrolled as displayed in Table 2 since the Medicaid certification procedure is carried out by workers from the Department of Social Services.

Eligibility for Medicaid Services:

Eligibility counts are for those individuals who have completed the review process and are actually certified to receive Medicaid Services. The average length of eligibility during the study year by HSA is displayed in Table 5. Average number of months eligible by age group is fairly similar across all HSAs except for Baltimore City where it is greater than 10 months for all age groups except at the

Table 3. Inventory of Primary/Ambulatory Care Services
and Settings in Maryland by Health Service Areas (HSA), 1978

Health Care Resource									
HSA	No. of Countys	Physicians	Peds.	Local	C&Y	CHC	HMOs	Hosp.	Hosp.
		Genl. Prac.		HD Clinics				OPDs	ERs
Western Maryland	4	77	24	22	--	3	--	5	6
Montgomery County	1	139	149	10	--	2	2	4	4
35 Southern Maryland	4	153	63	16	--	--	3	7	8
Central Maryland Baltimore City	6	324	179	62	5	12	10	25	25
Eastern Shore	9	74	24	15	--	3	--	5	6

Abbreviations Used:

HSA = Health Service Area
Genl. Prac. = General/Family Practitioners
Peds. = Pediatricians
HD = Health Department

C&Y = Children and Youth, Title 5 Project
CHC = Community Health Center
HMO = Health Maintenance Organization
OPD = Hospital Outpatient Department
ER = Hospital Emergency Room

Source: Maryland Preliminary State Health Plan. Vol. 2 Analysis and Policies. Maryland
Planning and Development Agency, July, 1979.

TABLE: 4

Table 4 .

HEALTH SERVICE RESOURCES AND POPULATION
BY HEALTH SERVICE AREA (HSA) 1976

HSA	Population	Persons Per	Physician/Population Ratio		
		Sq. Mile	Gen.	Prac.	Peds.**
Maryland	4,125,300*	418	---	---	---
Western Maryland HSA	315,530	143	1/4098		1/3168
Montgomery County HSA	572,920	1,162	1/4122		1/933
Southern Maryland HSA	818,950	537	1/5353		1/3446
Central Maryland HSA	2,139,740	949	1/6666		1/2988
Baltimore City	813,850	10,362	1/5765		1/3055
Eastern Shore	278,160	82	1/3759		1/2766

*About 30% of population are 17 years of age or less.

**Ratio for pediatrician based on population through 14 years of age.

Source: Maryland Preliminary State Health Plan
Vol. 2, Analysis and Policies. Maryland
Health Planning and Development Agency,
July, 1979.

TABLE: 5

MEAN NUMBER OF MONTHS ELIGIBLE FOR MEDICAID DURING
FY 1981 BY AGE, RACE, SEX AND HSA. MEDICAID-ELIGIBLE
CHILDREN <21 YEARS, MARYLAND.

Age, Race and Sex :		WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
Age :								
<1 :								
	Mean :	5.2	5.5	5.4	5.4	5.2	5.9:	5.6
	S.D. :	3.0	3.2	3.1	3.2	3.0	3.3:	3.2
1-5 :								
	Mean :	8.2	8.7	8.7	8.4	8.1	10.1:	9.3
	S.D. :	3.8	3.8	3.8	3.8	3.8	3.2:	3.6
6-10 :								
	Mean :	8.7	8.9	9.0	8.7	8.6	10.3:	9.6
	S.D. :	3.8	3.7	3.7	3.8	3.8	3.1:	3.5
11-15 :								
	Mean :	8.7	9.1	9.2	8.9	8.8	10.3:	9.6
	S.D. :	3.8	3.7	3.7	3.8	3.8	3.1:	3.5
16-20 :								
	Mean :	7.7	8.2	8.2	7.9	7.6	9.1:	8.6
	S.D. :	3.9	3.8	3.9	3.9	3.9	3.7:	3.8
Race :								
White :								
	Mean :	7.9	8.4	8.1	8.1	7.4	9.0:	8.3
	S.D. :	3.9	3.8	3.9	3.9	3.9	3.7:	3.9
Nonwhite :								
	Mean :	9.2	8.6	8.8	8.7	8.6	9.9:	9.5
	S.D. :	3.7	3.8	3.8	3.8	3.8	3.3:	3.5
Sex :								
Male :								
	Mean :	8.2	8.5	8.6	8.3	8.0	9.8:	9.1
	S.D. :	3.9	3.8	3.8	3.8	3.9	3.4:	3.7
Female :								
	Mean :	8.0	8.5	8.5	8.2	8.0	9.7:	9.0
	S.D. :	3.9	3.8	3.8	3.9	3.9	3.4:	3.7
Total :								
	Mean :	8.1	8.5	8.6	8.3	8.0	9.7:	9.0
	S.D. :	3.9	3.8	3.8	3.8	3.9	3.4:	3.7

extremes. When examined by race the number of months eligible is about 1 month longer for non-whites compared to whites.

In Table 6 is a composite of data indicating the average number of months which elapsed from the start of the first Medicaid eligibility to the beginning of the Fiscal Year 1981 study. Table 6 gives the time interval in months from first date of eligibility to the study year while Table 6a gives the average number of months actually enrolled in the Medicaid program from the first date of eligibility to the start of the study year. When adjusted for age, duration of prior eligibility was quite comparable across most HSAs except in Baltimore City where the number of months eligible increased significantly with increasing age. Comparing Baltimore City with the rest of the State for the 1-5 year old group, prior eligibility was 7 months longer. For the 6-10 year old group, it was about 2 years longer and for the 11-15 about 3 years longer and slightly less for the oldest group. In Table 7 the actual distribution of prior eligibility grouped by months and HSA is displayed. In Baltimore City only about 17 percent of study children had no prior Medicaid experience while in other parts of the State 30 percent of children had no prior Medicaid experience before the study year. In Baltimore City almost 50 percent of children had prior Medicaid eligibility of 3 years or longer compared to about half that percentage in other parts of the State.

Study Population and Eligibility:

For Maryland as a whole age and length of eligibility during the study year is displayed in Table 8 and subsequent tables. In reading these tables "SMONTHS" represents the number of months eligible during the study year, FY 1981. "TMONTHS" equals the total number of months actually eligible for services from the date of first eligibility to July 1, 1980, the start of the study year. Fifty-two percent of the population were eligible for the entire 12 months of the study period. Only 29 percent of the total enrolled population were eligible for 6 months or less during the study year. When months of eligibility by age group was examined, it was surprisingly similar for all ages except in the under 1 year group as might be expected. In Table 9 months of eligibility during the study period was 1.2 months greater for non-whites compared to white clients. In Table 10 months of prior eligibility is cross tabulated with duration of eligibility during the study year. Children with at least 3 years of prior eligibility who were also eligible for 12 months during the study year represented 73.9 percent of that group suggesting a high degree of continuity during that 4 plus year time period.

TABLE: 6

MEAN NUMBER OF MONTHS FROM START OF FIRST MEDICAID ELIGIBILITY PERIOD TO START OF FY 1981 BY AGE, RACE, SEX AND HSA. MEDICAID-ENROLLED CHILDREN, FY 1981, MARYLAND

Age, Race and Sex	:	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
Age	:							
<1	:							
Mean :		0.0	0.0	0.0	0.0	0.0	0.0:	0.0
S.D. :		0.0	0.0	0.0	0.0	0.0	0.0:	0.0
1-5	:							
Mean :		14.7	14.9	13.9	13.1	15.3	20.4:	17.2
S.D. :		16.4	16.2	15.5	15.4	16.3	17.0:	16.7
6-10	:							
Mean :		42.5	36.8	37.1	32.7	39.5	59.4:	48.1
S.D. :		38.7	36.0	36.3	33.6	36.2	34.8:	37.1
11-15	:							
Mean :		61.8	52.0	54.5	43.1	55.1	87.2:	69.6
S.D. :		58.0	52.7	53.9	47.2	53.9	53.9:	56.1
16-20	:							
Mean :		42.9	38.4	43.1	34.3	41.5	72.6:	56.6
S.D. :		57.8	52.9	55.8	47.9	55.6	66.6:	62.8
Race	:							
White	:							
Mean :		34.7	33.9	28.1	26.8	26.9	42.4:	32.5
S.D. :		46.3	42.4	40.0	36.8	38.4	47.7:	42.5
Nonwhite	:							
Mean :		48.2	30.8	35.8	30.6	39.7	57.8:	49.8
S.D. :		54.5	43.4	46.2	42.0	47.8	53.9:	52.3
Sex	:							
Male	:							
Mean :		38.3	32.9	34.5	29.5	34.8	57.5:	45.4
S.D. :		48.4	43.3	44.9	39.5	44.4	53.5:	50.3
Female	:							
Mean :		34.5	31.6	31.9	26.7	32.2	52.5:	41.6
S.D. :		46.7	42.6	43.7	37.7	43.5	52.6:	48.9
Total	:							
Mean :		36.3	32.3	33.1	28.0	33.4	54.9:	43.4
S.D. :		47.6	42.9	44.3	38.6	43.9	53.1:	49.6

TABLE: 6a

MEAN NUMBER OF MONTHS ENROLLED IN MEDICAID FROM START OF FIRST
 MEDICAID ELIGIBILITY PERIOD TO START OF FY 1981 BY AGE,
 RACE, SEX AND HSA. MEDICAID-ENROLLED CHILDREN, FY 1981, MARYLAND

Age, Race and Sex	:	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
Age	:							
<1	:							
Mean	:	0.0	0.0	0.0	0.0	0.0	0.0:	0.0
S.D.	:	0.0	0.0	0.0	0.0	0.0	0.0:	0.0
1-5	:							
Mean	:	11.7	13.7	12.6	11.3	12.7	19.5:	15.8
S.D.	:	13.6	15.1	14.2	13.6	14.1	16.4:	15.7
6-10	:							
Mean	:	34.5	32.4	32.9	27.7	32.3	55.8:	43.6
S.D.	:	34.1	32.6	33.2	29.8	31.7	33.8:	35.1
11-15	:							
Mean	:	53.1	47.2	48.9	37.7	46.6	82.3:	64.0
S.D.	:	53.1	49.0	50.0	43.1	48.0	52.7:	53.8
16-20	:							
Mean	:	38.2	35.7	39.3	30.8	36.2	69.3:	53.0
S.D.	:	54.1	50.2	52.3	44.5	50.7	65.0:	60.5
Race	:							
White	:							
Mean	:	29.1	30.3	24.7	22.9	21.8	38.9:	28.4
S.D.	:	41.6	39.1	36.2	32.7	33.3	44.9:	38.9
Nonwhite	:							
Mean	:	43.6	28.4	32.6	27.9	34.4	55.0:	46.8
S.D.	:	51.7	40.6	43.0	39.5	43.0	52.3:	50.3
Sex	:							
Male	:							
Mean	:	32.5	29.9	31.1	25.9	29.4	54.5:	41.9
S.D.	:	44.1	40.3	41.5	36.0	39.5	51.8:	47.9
Female	:							
Mean	:	29.3	28.7	28.7	23.2	27.1	49.7:	38.3
S.D.	:	42.4	39.6	40.4	34.1	38.6	50.9:	46.5
Total	:							
Mean	:	30.8	29.3	29.8	24.5	28.2	52.0:	40.0
S.D.	:	43.2	39.9	41.0	35.0	39.1	51.4:	47.2

TABLE 7 : TMONTHS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

TMONTHS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO :	TOTAL
0 :	4,286	3,630	11,658	13,467	5,734	22,028 :	60,803
% :	31.3	29.0	29.3	30.9	29.7	16.8 :	23.4
:						:	
1-12 :	3,211	3,004	9,391	11,196	4,647	20,858 :	52,307
% :	23.5	24.0	23.6	25.7	24.1	15.9 :	20.1
:						:	
13-36 :	2,284	2,358	7,630	8,710	3,700	24,513 :	49,195
% :	16.7	18.8	19.2	20.0	19.2	18.7 :	18.9
:						:	
37-60 :	1,182	1,280	3,644	4,186	1,913	15,979 :	28,184
% :	8.6	10.2	9.2	9.6	9.9	12.2 :	10.8
:						:	
61-108 :	1,484	1,373	4,399	4,071	2,027	23,674 :	37,028
% :	10.8	11.0	11.1	9.3	10.5	18.0 :	14.2
:						:	
109-999 :	1,238	879	3,089	1,995	1,269	24,158 :	32,628
% :	9.1	7.0	7.8	4.6	6.6	18.4 :	12.5
<hr/>							
TOTAL :	13,685	12,524	39,811	43,625	19,290	131,210 :	260,145
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0 :	100.0
<hr/>							
MEAN :	30.8	29.3	29.8	24.5	28.2	52.0 :	40.0
S.D. :	43.2	39.9	41.0	35.0	39.1	51.4 :	47.2

TABLE 8 : SMONTHS BY AGE IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

AGE :	<1	1-5	6-10	11-15	16-20	:	TOTAL	PRCNT
SMONTHS :						:		
1-3 :	4441	8234	5739	5493	9382	:	33289	12.8
4-6 :	4657	10585	7425	7106	11308	:	41081	15.8
7-11 :	4706	14406	10222	9379	12812	:	51525	19.8
12 :	585	39161	33400	33715	27389	:	134250	51.6
TOTAL :	14389	72386	56786	55693	60891	:	260145	100.0
PRCNT :	5.5	27.8	21.8	21.4	23.4	:	100.0	
MEAN :	5.6	9.3	9.6	9.6	8.6	:	9.0	
S.D. :	3.2	3.6	3.5	3.5	3.8	:	3.7	

TABLE 9 : SMONTHS BY RACE IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

RACE :		WHITE	NONWHITE	: TOTAL PRCNT	
SMONTHS :				:	
:				:	
1-3 :	15920	17369	:	33289	12.8
4-6 :	19634	21447	:	41081	15.8
7-11 :	20983	30542	:	51525	19.8
12 :	39288	94962	:	134250	51.6
TOTAL :		95825	164320	:	260145 100.0
PRCNT :		36.8	63.2	:	100.0
MEAN :		8.3	9.5	:	9.0
S.D. :		3.9	3.5	:	3.7

TABLE 10 : SMONTHS BY TMONTHS IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

TMONTHS :	0	1-12	13-36	37-60	61-108	109-999	:	TOTAL	PRCNT
SMONTHS :							:		
1-3 :	16723	6777	4266	1829	2000	1694	:	33289	12.8
4-6 :	20465	7850	5309	2376	2666	2415	:	41081	15.8
7-11 :	20524	10617	7875	3842	4681	3986	:	51525	19.8
12 :	3091	27063	31745	20137	27681	24533	:	134250	51.6
TOTAL :	60803	52307	49195	28184	37028	32628	:	260145	100.0
PRCNT :	23.4	20.1	18.9	10.8	14.2	12.5	:	100.0	
MEAN :	5.9	9.0	9.9	10.4	10.6	10.6	:	9.0	
S.D. :	3.2	3.7	3.3	3.0	2.9	2.8	:	3.7	

However, there was also a fair degree of fluidity of eligibility since only 27.8 percent of the total population fell into this group with 4 years or more of continuing eligibility. In Table 11 eligibility prior to the study year is displayed by race. Overall for the entire enrolled study population average length of prior eligibility for whites was 28.4 months while for non-whites was 46.8 months.

Payments for Medicaid Services:

Total payments for all Medicaid services received during the study year are tabulated in Table 12 by HSA. Across all jurisdictions about one-third of enrollees received no services during the study year. Average payment per enrollee was about \$315 per enrollee per study year. This figure was not adjusted for length of enrollment. In the Annual Report of the Medical Assistance Administration, average payment per enrollee, remembering that this figure for enrollees is the average per month rather than the total number of children eligible, was \$406 per enrollee. Average payments per HSA were fairly similar with a range of \$281 for the Western Maryland HSA and a high of \$323 for the Southern Maryland HSA and for Baltimore City. The average payment for users was \$471 per user of Medicaid services. In Table 12a the distribution of total payments by number of users is given. Payments amounting to 68.6 percent of the total expended for the child population were expended for 9.3 percent of the total or 16,009 patients. If all enrollees are included in the calculations, 68.6 percent of expenditures were paid to 6.2 percent of total enrollees.

Total payments by age for the overall State is recorded in Table 13 for all enrollees. Total payments for users of services aged less than 1 year, \$1,209, 1-5 years, \$420, 6-10 years, \$265, 11-15 years, \$309, 16-20 years, \$661. In Table 13a the distribution of total Medicaid payments by age group states that 42.3 percent of total payments went to the age group 0-5 years of age. Total payments by race for the entire State are calculated in Table 14. No payments and presumably no services were provided to 31.1 percent of white patients while 34.3 percent of non-white patients received no services. Payments for users were \$473 for whites and \$469 for non-whites. Third party coverage for health care services is tabulated in Table 15 by race. Few children were beneficiaries of insurance coverage other than Medicaid and in Table 15, 8.3 percent of white patients and 3.7 percent of non-whites had any type of additional health care insurance. Very likely many of these policies failed to cover preventive services thereby leaving payment to the Medicaid Program. Prepayment for Medicaid coverage had been encouraged as a way of formulating a more logical approach to health care financing in place of fee for service

TABLE 11 : TMONTHS BY RACE IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

RACE :	WHITE	NONWHITE	TOTAL	PRCNT
TMONTHS :	:	:	:	:
0 :	27972	32831	60803	23.4
1-12 :	23378	28929	52307	20.1
13-36 :	18313	30882	49195	18.9
37-60 :	9249	18935	28184	10.8
61-108 :	10678	26350	37028	14.2
109-999 :	6235	26393	32628	12.5
TOTAL :	95825	164320	260145	100.0
PRCNT :	36.8	63.2	100.0	
MEAN :	28.4	46.8	40.0	
S.D. :	38.9	50.3	47.2	

TABLE 12 : GRAND TOTAL PAYMENTS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

GRAND-TOT PAYMENTS	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
0 :	3,829	4,527	14,927	14,503	5,650	42,620:	86,056
% :	28.0	36.2	37.5	33.3	29.3	32.5:	33.1
:						:	
1-50 :	2,601	1,953	6,745	7,765	3,639	20,774:	43,477
% :	19.0	15.6	17.0	17.8	18.9	15.9:	16.7
:						:	
51-100 :	1,997	1,531	5,133	5,824	2,803	16,920:	34,208
% :	14.6	12.2	12.9	13.4	14.5	12.9:	13.2
:						:	
101-200 :	2,143	1,780	5,219	6,266	3,013	20,143:	38,564
% :	15.7	14.2	13.1	14.4	15.6	15.4:	14.8
:						:	
201-500 :	1,634	1,613	4,095	5,216	2,075	17,561:	32,194
% :	12.0	12.9	10.3	12.0	10.8	13.4:	12.4
:						:	
501-1000 :	598	471	1,235	1,511	816	4,739:	9,370
% :	4.4	3.8	3.1	3.5	4.2	3.6:	3.6
:						:	
1001-2500 :	650	410	1,594	1,703	926	5,335:	10,618
% :	4.8	3.3	4.0	3.9	4.8	4.1:	4.1
:						:	
2501-5000 :	142	138	505	491	225	1,888:	3,389
% :	1.0	1.1	1.3	1.1	1.2	1.4:	1.3
:						:	
>5000 :	82	93	330	320	134	1,125:	2,084
% :	0.6	0.7	0.8	0.7	0.7	0.9:	0.8
<hr/>							
TOTAL :	13,676	12,516	39,783	43,599	19,281	131,105:	259,960
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	280.8	320.9	323.3	299.8	296.1	322.8:	314.7
S.D. :	1180.1	2681.6	2437.7	1818.8	1390.3	1645.7:	1842.0

TABLE: 12a

Distribution of Total Payments by Number of Users. Maryland, FY 1981.

Total Payments (Dollars)	No. of Users	Percent of Total Users	Mean Payment for Range	Percent of Payments
1-200	116,297	66.8%	80	11.4%
201-500	32,219	18.5	305	12.0
501-1000	9,376	5.4	701	8.0
1001-2500	10,623	6.2	1,592	20.7
2501-5000	3,391	1.9	3,421	14.2
5000-10,000	1,243	0.7	6,740	10.2
10,001-25,000	640	0.4	14,968	11.7
25,000 +	202	0.1	47,812	11.8
	173,991			

*Total payments for age group 0-20 years \$81,856,535.

TABLE 13 : GRAND TOTAL PAYMENTS BY AGE IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRCNT
GRAND-TOT PAYMENTS :							
0 :	3563	21130	20503	20559	20301 :	86056	33.1
1-50 :	2482	12770	10813	9688	7724 :	43477	16.7
51-100 :	2008	10245	8275	7580	6100 :	34208	13.2
101-200 :	2110	11865	8616	8313	7660 :	38564	14.8
201-500 :	1558	10015	5910	6305	8406 :	32194	12.4
501-1000 :	629	2740	1286	1541	3174 :	9370	3.6
1001-2500 :	1004	2426	940	1129	5119 :	10618	4.1
2501-5000 :	444	612	229	336	1768 :	3389	1.3
>5000 :	571	537	188	217	571 :	2084	0.8
TOTAL :	14369	72340	56760	55668	60823 :	259960	100.0
PRCNT :	5.5	27.8	21.8	21.4	23.4 :	100.0	
MEAN :	909.3	297.4	169.3	194.8	440.3 :	314.7	
S.D. :	4447.1	1974.4	1128.9	1328.8	1502.1 :	1842.0	

TABLE: 13a

Distribution of Total Medicaid Payments by Age Group.
Maryland, FY 1981.

Age Group Years	No. Users	Total Payments	%	Cumulative %
<1	10,812	13,071,708	16.0	16.0
1-5	51,227	21,520,462	26.3	42.3
6-10	36,267	9,610,755	11.7	54.0
11-15	35,120	10,852,080	13.3	67.3
16-20	40,565	26,801,295	32.7	100.0
Total	173,991	\$81,856,300		

TABLE 14 : GRAND TOTAL PAYMENTS BY RACE IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81

RACE :		WHITE	NONWHITE	TOTAL PRCNT	
-----+-----+-----					
GRAND-TOT	PAYMENTS	:	:		
	:		:		
0	:	29779	56277	:	86056 33.1
1-50	:	16345	27132	:	43477 16.7
51-100	:	12614	21594	:	34208 13.2
101-200	:	14232	24332	:	38564 14.8
201-500	:	12272	19922	:	32194 12.4
501-1000	:	4036	5334	:	9370 3.6
1001-2500	:	4439	6179	:	10618 4.1
2501-5000	:	1275	2114	:	3389 1.3
>5000	:	760	1324	:	2084 0.8
-----+-----+-----					
TOTAL	:	95752	164208	:	259960 100.0
PRCNT	:	36.8	63.2	:	100.0
-----+-----+-----					
MEAN	:	325.9	308.2	:	314.7
S.D.	:	1824.6	1852.1	:	1842.0

TABLE 15 : INSURANCE BY RACE IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

RACE :	WHITE	NONWHITE	TOTAL	PRCNT
-----+-----+-----+-----				
INSURANCE :				
BC/BS :	3785	3088	6873	2.6
GROUP HOSP INC :	387	447	834	0.3
AETNA :	213	149	362	0.1
CONNECTICUT GEN :	212	114	326	0.1
EQUITABLE LIFE :	51	43	94	0.0
LINCOLN NATIONAL :	99	40	139	0.1
METROPOLITAN :	121	104	225	0.1
PRUDENTIAL :	286	160	446	0.2
TRAVELERS :	279	73	352	0.1
CHAMPUS/VA :	544	381	925	0.4
OTHER CARRIER :	1009	622	1631	0.6
UNION OR ASSOC :	738	674	1412	0.5
>1 CARRIER :	157	115	272	0.1
POTENTIAL INS :	32	3	35	0.0
NO INSUR :	5037	4620	9657	3.7
BLANK :	82853	153678	236531	90.9
-----+-----+-----+-----				
TOTAL :	95803	164311	260114	100.0
PRCNT :	36.8	63.2	100.0	
-----+-----+-----+-----				

payments. In Table 16, 12,469 patients were covered by prepayment plans sometime during the study year. Of those covered by such programs, 7 percent were white and 93 percent non-white.

Services Provided by the Medicaid Program:

As a major contributor to the cost of care, hospitalization experience was examined in the next several tables. In Table 17 the average number of inpatient days by HSA is tabulated for the entire State. Western Maryland is the lowest with 7.1 days for total hospital days per patient. The Eastern Shore HSA was 7.5 days and the others were about 8 days per user with Baltimore City at 8.8 days. The percentage of the total enrolled population who were inpatient care users is also given in the Table. At the low end 6.1 percent of Montgomery County enrollees had more than one hospitalization while the Eastern Shore and Western Maryland were highest at about 10 percent. Perhaps in these two less heavily populated areas hospitalization is resorted to more often due to the inaccessibility of ambulatory care and the greater distances than elsewhere. Of the Baltimore enrollees 7 percent had been hospitalized which is the second lowest figure perhaps indicating the greater accessibility of ambulatory care services. The distribution and average of inpatient days for patients with one or more hospitalizations during the study year is given in Table 18. Of the 19,323 patients who were hospitalized at least once during the study year, 13.5 percent were under a year of age and averaged 14.8 days of inpatient care. For older children the average of inpatient days ranged from 6.3 for the 16-20 year old group to 8.6 for the 1-5 year old group. Total payments for inpatient care amounted to about \$49 million dollars and the distribution by range of payment in HSA is given in Table 19.

Total inpatient care payments by age are given in Table 18a. The average payment per user and per admission is highest for the under 1 age group reflecting the large number of low birthweight infants cared for in neonatal intensive care units in this group. Indeed in the under 1 age group the percentage of patients with payments greater than \$5,000 was 15 percent in the under 1 group which is greater than for any of the other age groups. Proportionately, 13.5 percent of patients were under 1 year of age but 21.5 percent of total inpatient costs were paid out for this age group. The data display in Table 18 further corroborates this disproportionate cost and usage for the under 1 year age group. The days of inpatient care per thousand enrollees is 2,648 for the under 1 group which is much higher than any other age group; however, for the oldest group aged 16 through 20 the hospitalization experience

TABLE:16 PREPAY BY RACE IN MARYLAND

SMONTHS:

1-12: 1 TO 12

RACE :		WHITE	NONWHITE :	TOTAL	PRCNT

PREPAY :			:		
			:		
EAST BALTIMORE MED PLAN :	59	3454	:	3513	28.2
WEST BALTIMORE MED PLAN :	180	2477	:	2657	21.3
CHESAPEAKE :	418	1385	:	1803	14.5
CONSTANT CARE :	31	2629	:	2660	21.3
METROPOLITAN BALTO HMO :	29	1	:	30	0.2
Y :	150	1611	:	1761	14.1
Z :	5	40	:	45	0.4

TOTAL :	872	11597	:	12469	100.0
PRCNT :	7.0	93.0	:	100.0	

TABLE 17 : INPATIENT DAYS BY HSA IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

DAYS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1-2 :	350	263	880	1,061	621	2,707:	5,882
% :	26.4	34.2	29.8	33.2	32.0	29.7:	30.4
:						:	
3-4 :	427	216	852	865	526	2,485:	5,371
% :	32.2	28.1	28.8	27.0	27.1	27.2:	27.8
5-10 :	346	168	731	746	485	2,267:	4,743
% :	26.1	21.9	24.7	23.3	25.0	24.8:	24.6
>10 :	204	121	494	528	310	1,670:	3,327
% :	15.4	15.8	16.7	16.5	16.0	18.3:	17.2
TOTAL :	1,327	768	2,957	3,200	1,942	9,129:	19,323
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
MEAN :	7.1	8.1	8.0	8.4	7.5	8.8:	8.3
S.D. :	11.5	17.5	15.0	16.7	13.4	17.0:	16.0
DAYS PER 1000 ENROLLEES	689	497	574	616	755	613	617
% USERS OF INPATIENT SERVICES	9.7	6.1	7.4	7.3	10.0	7.0	7.4
MEAN DAYS PER ADM.	5.4	6.8	6.7	7.0	5.8	7.3	6.9

Table 18: INPATIENT DAYS BY AGE IN MARYLAND

SMONTHS:

1-12: 1 TO 12

BYEAR:

60-81: 60 TO 81

AGE:	<1	1-5	6-10	11-15	16-20	:	TOTAL	PRCNT
Days :								
1-2 :	391	1750	893	745	2103	:	5882	30.4
3-4 :	515	1040	380	506	2930	:	5371	27.8
5-10:	767	1016	329	431	2200	:	4743	24.6
>10:	933	815	271	355	953	:	3327	17.2
TOTAL:	2606	4621	1873	2037	8186	:	19323	100.0
PRCNT:	13.5	23.9	9.7	10.5	42.4	:	100.0	
MEAN:	14.8	8.6	7.6	8.3	6.3	:	8.3	
S.D.:	22.3	17.8	17.4	17.1	10.5	:	16.0	
In-patient Days per 1000	2684	549	251	304	848		617	
Mean Days per Admission	12.3	7.2	6.3	6.9	5.2		6.9	

TABLE 18a: INPATIENT TOTAL PAYMENTS BY AGE IN MARYLAND

SMONTHS:

1-12: 1 TO 12

BYEAR:

60-81: 60 TO 81

AGE:		<1	1-5	6-10	11-15	16-20	:	TOTAL	PRCNT

INPT PAYMENTS:									

57	0:	10948	67574	54754	53487	52260	:	239023	92.0
	1-50:	665	204	92	102	306	:	1369	0.5
	51-100:	167	79	70	43	124	:	483	0.2
	101-200:	89	75	40	51	184	:	439	0.2
	201-500:	237	436	177	203	525	:	1578	0.6
	501-1000:	458	1352	678	548	1319	:	4355	1.7
	1001-2500:	894	1690	613	797	4404	:	8398	3.2
	2501-5000:	389	457	174	259	1275	:	2554	1.0
	>5000:	522	473	162	178	426	:	1761	0.7

TOTAL:		14369	72340	56760	55668	60823	:	259960	100.0

PRCNT:		5.5	27.8	21.8	21.4	23.4	:	100.0	

MEAN:		734.5	167.2	78.0	90.4	277.2	:	188.4	
S.D.:		3626.9	1622.1	1078.2	1103.6	1354.9	:	1557.7	

MEAN FOR									
USERS		3085	2538	2207	2307	1969			

MEAN PER									
ADMISSION		2571	2115	1839	1923	1641			

increases to 848 days per thousand enrollees in the age group due to increases for injuries and obstetrical care.

The differences in inpatient utilization illustrated in Table 17 are again confirmed and extended in Table 19 which gives the average for each enrollee and for each user. The payment per user is also reflected in the payments per day for inpatient care. Western Maryland rates were \$201 per day. Southern Maryland rates were probably greatly influenced by the Washington Metropolitan Area inpatient payments and averaged \$319 per day. Baltimore City was slightly below this at \$300 per day. However, Baltimore City had the highest average per user or per admission payment because as shown in Table 17, hospitalizations tended to average 8.8 days which was longer than any other area.

When average number of inpatient days per user is tabulated against duration of eligibility during the study year as in Table 19a, the results are remarkably similar. Duration of eligibility of 12 months showed a slightly lower number of inpatient days compared to other periods of eligibility suggesting that very likely Medicaid certification was sought because of illness. Whether or not longer periods of Medicaid services might result in lower rates of inpatient care will be examined in a later analysis.

Average number of inpatient days by race is displayed in Table 20. The average number of inpatient days for white users was 7.8 days while for non-whites it was 8.7 days. Whether it was because of more serious illness in the later group or because there was a greater concentration in Baltimore City or both is not clear from these data.

Average number of hospital clinic visits by users for each HSA is displayed in Table 21. Hospital clinic utilization roughly varies with the availability of these facilities in the various HSAs. The calculations for Montgomery County and Southern Maryland are somewhat distorted because hospital clinic facilities in the neighboring District of Columbia are not tabulated in Table 2 where health care facilities are inventoried although Maryland Medical Assistance paid for services in those facilities. Average number of visits to a private physicians office by HSA is displayed in Table 22. These utilization rates are calculated for total number of enrollees in each of the HSAs. In Baltimore City 69.2 percent of Medicaid enrollees made no visits to a private physicians's office. In Southern Maryland and Montgomery County, 58.5 percent and 56.8 percent of enrollees made no

Table 19: INPATIENT PAYMENTS BY HSA IN MARYLAND

SMONTHS:

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

INPT PAYMENTS:	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL	%
0:	12,012	11,951	36,492	40,150	16,938	121,480	239,023	92.0
1-50:	238	28	214	239	279	371	1,369	0.5
51-100:	59	34	104	99	75	112	483	0.2
101-200:	49	19	80	78	60	153	439	0.2
201-500:	198	66	257	250	244	563	1,578	0.6
501-1000:	446	133	653	831	647	1,645	4,355	1.7
1001-2500:	480	179	1,288	1,310	748	4,393	8,398	3.2
2501-5000:	118	57	401	369	169	1,440	2,554	1.0
>5000:	76	49	294	273	121	948	1,761	0.7
TOTAL:	13,676	12,516	39,783	43,599	19,281	131,105	259,960	100
MEAN:	173.6	94.3	211.3	179.4	195.3	193.9	188.4	
S.D.:	1121.3	1026.7	1891.3	1580.0	1348.8	1547.7	1557.7	

Mean per User:	\$1426.8	2089.0	2554.3	2267.8	1607.2	2641.2	2339.2	
Mean per Admission:	\$1097.5	1740.8	2218.6	1889.8	1236.3	2201.0	1949.3	
Mean per Day:	\$201.0	257.9	319.3	270.0	214.3	300.1	281.8	

TABLE 19a: INPATIENT DAYS BY MONTHS OF ELIGIBILITY IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

SMONTHS :	1-3	4-6	7-11	12 :	TOTAL PRCNT	
DAYS :						
1-2 :	495	894	1264	3229 :	5882	30.4
3-4 :	346	954	1514	2557 :	5371	27.8
5-10 :	364	824	1316	2239 :	4743	24.6
>10 :	318	629	870	1510 :	3327	17.2
TOTAL :	1523	3301	4964	9535 :	19323	100.0
PRCNT :	7.9	17.1	25.7	49.4 :	100.0	
MEAN :	8.2	9.0	8.8	7.9 :	8.3	
S.D. :	13.3	16.9	17.2	15.4 :	16.0	

TABLE 20: INPATIENT DAYS BY RACE IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

RACE :	WHITE	NONWHITE :	TOTAL PRCNT	
DAYS :		:		
1-2 :	2572	3310 :	5882	30.4
3-4 :	2345	3026 :	5371	27.8
5-10 :	1922	2821 :	4743	24.6
>10 :	1336	1991 :	3327	17.2
TOTAL :	8175	11148 :	19323	100.0
PRCNT :	42.3	57.7 :	100.0	
MEAN :	7.8	8.7 :	8.3	
S.D. :	14.6	17.0 :	16.0	

TABLE 21: CLINIC VISITS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

CLINIC VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1 :	154	216	1,647	2,545	683	16,127:	21,372
% :	69.7	47.5	55.6	50.5	67.6	33.4:	36.8
:						:	
2 :	37	88	645	1,062	169	9,325:	11,326
% :	16.7	19.3	21.8	21.1	16.7	19.3:	19.5
:						:	
3 :	12	44	316	564	71	6,207:	7,214
% :	5.4	9.7	10.7	11.2	7.0	12.9:	12.4
:						:	
4 :	12	39	155	296	41	4,386:	4,929
% :	5.4	8.6	5.2	5.9	4.1	9.1:	8.5
:						:	
5-10 :	6	60	188	501	42	9,800:	10,597
% :	2.7	13.2	6.4	9.9	4.2	20.3:	18.3
:						:	
>10 :	0	8	11	72	5	2,476:	2,572
% :	0.0	1.8	0.4	1.4	0.5	5.1:	4.4
<hr/>							
TOTAL :	221	455	2,962	5,040	1,011	48,321:	58,010
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	1.6	2.6	2.0	2.4	1.7	3.6:	3.4
S.D. :	1.3	2.4	1.6	2.4	1.5	3.7:	3.5

TABLE 22: OFFICE VISITS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

OFFICE VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
0 :	7,020	7,105	23,266	22,914	9,286	90,685	160,276
% :	51.3	56.8	58.5	52.6	48.2	69.2	61.7
1-2 :	3,646	2,707	9,028	10,332	4,986	23,492	54,191
% :	26.7	21.6	22.7	23.7	25.9	17.9	20.9
3-4 :	1,448	1,156	3,588	4,723	2,297	8,540	21,752
% :	10.6	9.2	9.0	10.8	11.9	6.5	8.4
5-10 :	1,258	1,139	3,042	4,436	2,135	6,838	18,848
% :	9.2	9.1	7.7	10.2	11.1	5.2	7.3
>10 :	304	409	859	1,194	577	1,550	4,893
% :	2.2	3.3	2.2	2.7	3.0	1.2	1.9
TOTAL :	13,676	12,516	39,783	43,599	19,281	131,105	259,960
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MEAN :	1.7	1.8	1.5	1.8	2.0	1.0	1.4
S.D. :	3.0	4.1	3.3	3.4	3.6	2.3	3.0

visits to private physicians probably reflecting limited access to these offices and the greater availability of hospital clinic facilities in the Washington Metropolitan Area.

Visits to a private physicians office by race is displayed in Table 23. Among white enrollees 52 percent made no visits to a private physicians office, while among non-whites 67.4 percent were in this category. Overall white enrollees made an average of 1.9 visits to a private physician's office, while non-whites made one visit to such facilities. This again reflects the disproportionate population figures of enrollees in Baltimore City. The trend was similar for users with an average of 4 visits for white users versus 3.1 visits for non-white users.

Of children making visits to private physician's offices, only 28.1 percent of these visited a pediatrician as shown in Table 24. For users of pediatricians services, average number of visits was almost as high as those to all private physicians suggesting that these are special groups of users who are particularly intent on obtaining a pediatrician's services. Average number of visits to a pediatrician's office by age group is given in Table 25. As expected the largest number of visits occurs in the youngest age group. Here again the average number of visits are quite comparable to the averages for all private physician's suggesting again that the users of pediatric services are a selected group. Of the 259,960 individuals eligible for services during the study year 109,551 or 42% made no ambulatory visits, Table 28. Of the remainder 82% visited no more than two different ambulatory care facilities as tabulated in Table 25a. This percentage of users is far greater than the 45% (Table 28) who made 1-2 ambulatory visits thereby suggesting that a limited number of facilities were used by most Medicaid users for ambulatory care. Patients visiting 5 or more facilities numbered 3,643 or 2% of all ambulatory care users. The frequency of use of multiple facilities was rather similar for all HSAs.

Emergency room visits for users are displayed in Table 26 and are surprisingly similar across all jurisdictions. The mean number of visits at 1.9 in Western Maryland perhaps is explained by the limited access to private offices in that area. These data suggest that across the several HSAs emergency rooms were not used excessively when looked at on a population basis. For all enrollees 20% made one or more emergency room visits during the 12 month period. Indeed only 6.1 percent of users made 4 or more visits to the emergency room during the study year.

Table: 23 Office Visits by Race in Maryland

Number of Office Visits	White	Nonwhite	Total	%
0	49,649 (52%)	110,627 (67.4%)	160,276	61.7
1-2	22,979	31,212	54,191	20.9
3-4	10,359	11,393	21,752	8.4
5-10	9,790	9,058	18,848	7.3
>10	2,975	1,918	4,893	1.9
Total	95,752	164,208	259,960	100.0
%	36.8	63.2	100.0	
Mean	1.9	1.0	1.4	
S.D.	3.6	2.4	3.0	
Mean for Users	4.0	3.1	3.7	

TABLE 24: PED VISITS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

PED VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1 :	745	575	1,583	2,704	971	2,925:	9,503
% :	38.7	33.2	37.9	34.7	27.4	33.2:	34.0
:						:	
2 :	396	303	883	1,621	602	2,555:	6,360
% :	20.6	17.5	21.1	20.8	17.0	29.0:	22.7
:						:	
3 :	243	225	532	1,020	477	1,036:	3,533
% :	12.6	13.0	12.7	13.1	13.5	11.8:	12.6
:						:	
4 :	151	147	317	690	352	666:	2,323
% :	7.9	8.5	7.6	8.9	9.9	7.6:	8.3
:						:	
5-10 :	309	332	671	1,435	857	1,352:	4,956
% :	16.1	19.2	16.1	18.4	24.2	15.4:	17.7
:						:	
>10 :	80	151	192	326	287	274:	1,310
% :	4.2	8.7	4.6	4.2	8.1	3.1:	4.7
<hr/>							
TOTAL :	1,924	1,733	4,178	7,796	3,546	8,808:	27,985
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	3.2	4.4	3.4	3.4	4.4	3.0:	3.5
S.D. :	3.6	6.1	4.6	3.5	4.8	2.9:	4.0

TABLE 25: PED VISITS BY AGE IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL PRCNT	
PED VISITS :							
1 :	733	3716	2428	1762	864 :	9503	34.0
2 :	545	2466	1613	1183	553 :	6360	22.7
3 :	421	1608	766	513	225 :	3533	12.6
4 :	324	1178	428	282	111 :	2323	8.3
5-10 :	877	2774	706	424	175 :	4956	17.7
>10 :	218	744	170	131	47 :	1310	4.7
TOTAL :	3118	12486	6111	4295	1975 :	27985	100.0
PRCNT :	11.1	44.6	21.8	15.4	7.1 :	100.0	
MEAN :	4.3	3.9	2.9	2.8	2.6 :	3.5	
S.D. :	3.7	4.0	4.1	3.8	3.3 :	4.0	

Table 25a: Number of different
Ambulatory care facilities
Visited by Medicaid users
Tabulated by HSA, Maryland, FY 1981.

Health Services Area

No. of Facilities Visited	WM	MC	SM	CM	ES	BALTO	MARYLAND	%
1	5,553	3,343	11,122	12,003	6,183	42,341	79,094	(53)
2	4,102	1,790	5,860	6,740	3,431	23,713	43,984	(29)
3-4	1,422	1,178	3,129	4,985	1,782	11,183	23,679	(16)
5+	149	238	483	1,084	214	1,475	3,643	(2)
No. of Users	11,226	6,549	20,594	24,812	11,610	78,712	150,400	(100)
Mean per User	1.8	1.9	1.7	1.9	1.7	1.7		

TABLE 26 ER VISITS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

HYEAR :

60-81 : 60 TO 81

ER VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1 :	2,410	1,424	6,192	5,887	3,075	15,589:	34,577
% :	54.7	65.2	66.7	68.3	66.3	67.9:	66.0
:						:	
2 :	1,057	488	1,892	1,732	939	4,689:	10,797
% :	24.0	22.3	20.4	20.1	20.3	20.1:	20.6
:						:	
3 :	438	154	652	562	361	1,624:	3,821
% :	9.9	7.1	7.3	6.5	7.8	7.0:	7.3
:						:	
4 :	235	74	297	230	145	704:	1,685
% :	5.3	3.4	3.2	2.7	3.1	3.0:	3.2
:						:	
5-10 :	255	42	220	196	110	635:	1,458
% :	5.8	1.9	2.4	2.3	2.4	2.7:	2.8
:						:	
>10 :	12	2	6	11	5	39:	75
% :	0.3	0.1	0.1	0.1	0.1	0.2:	0.1
<hr/>							
TOTAL :	4,407	2,184	9,289	8,618	4,635	23,280:	52,413
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	1.9	1.6	1.6	1.5	1.6	1.6:	1.6
S.D. :	1.5	1.0	1.1	1.1	1.1	1.2:	1.2

The Early Periodic Screening, Diagnosis and Treatment (EPSDT) Program provides comprehensive health supervision services for Medicaid enrollees (12). Data were assembled to tabulate the experience for EPSDT visits to private physician's offices and to clinics including the Children and Youth Programs (C&Y) in Baltimore City. Health Department EPSDT screening activities are not included in these tabulations because they were entered into a different reporting system. As shown in Table 27, only a small percentage of enrollees availed themselves of these services. Indeed only 5.5 percent of enrollees made use of these EPSDT health supervision services. However, as demonstrated in later analyses some physicians providing similar services may have used specific Health Supervision procedure codes on billing invoices rather than EPSDT codes. Therefore, many more Medicaid enrollees received health supervision services than is indicated by the EPSDT tabulations. The average number of all ambulatory services tabulated for enrollees is displayed in Table 28. Overall 57.9 percent of enrollees made use of ambulatory services of one source or another. These proportions are fairly similar across all HSAs except in the Washington Metropolitan Area where the percentage of ambulatory care facility users fell to about 52 percent.

In Table 29 average number of dental visit for users is tabulated by HSA. Among Medicaid enrollees 21.1 percent received dental services. The proportion of users for each HSA appears to vary with the availability of dentists willing to accept Medicaid children.

Utilization of Services and Payment by Various Types of Providers:

In this section of the analysis, utilization of services and payments are examined for children based on their usual source of medical care. The usual provider of care (usual provider continuity, UPC) was calculated by examining all ambulatory visits for a user and designating the UPC as that provider which was responsible for the modal number of visits a technique somewhat similar to that of Breslau and Haug (13). However, a single visit was sufficient to place a user in a particular UPC category. In Table 30 UPCs are tabulated for the various HSAs. Private physicians are the usual providers of care in all HSAs at a surprisingly consistent rate of about 40 percent. In Baltimore City this fell to 22.8 percent while the OPD was designated as the UPC in 26.9 percent of users in that jurisdiction. This compared with an average of 3.5 percent in other HSAs. Emergency rooms identified as a UPC averaged a little over 6 percent, although in Western Maryland the percentage was more than double that at 14.5

TABLE 27 : EPSDT VISITS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

EPSDT VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1 :	177	162	579	1,072	236	10,547:	12,773
% :	83.5	86.2	81.4	86.7	82.5	90.9:	89.7
:						:	
2 :	21	19	80	97	36	779:	1,032
% :	9.9	10.1	11.3	7.8	12.6	6.7:	7.3
:						:	
3 :	11	4	39	41	9	198:	302
% :	5.2	2.1	5.5	3.3	3.2	1.7:	2.1
:						:	
4 :	3	2	9	16	4	56:	90
% :	1.4	1.1	1.3	1.3	1.4	0.5:	0.6
:						:	
5-10 :	0	1	4	11	1	22:	39
% :	0.0	0.5	0.6	0.9	0.4	0.2:	0.3
:						:	
>10 :	0	0	0	0	0	0:	0
% :	0.0	0.0	0.0	0.0	0.0	0.0:	0.0
<hr/>							
TOTAL :	212	188	711	1,237	286	11,602:	14,236
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	1.2	1.2	1.3	1.2	1.2	1.1:	1.1
S.D. :	0.6	0.6	0.7	0.7	0.6	0.4:	0.5

TABLE 28 : AMBULATORY VISITS BY HSA IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81

AMBUL VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
0 :	5,553	5,966	19,189	18,784	7,671	52,388:	109,551
% :	40.6	47.7	48.2	43.1	39.8	40.0:	42.1
:						:	
1-2 :	3,933	3,061	10,392	11,263	5,404	34,156:	68,209
% :	28.8	24.5	26.1	25.8	28.0	26.1:	26.2
:						:	
3-4 :	1,886	1,433	4,578	5,749	2,735	18,009:	34,390
% :	13.8	11.5	11.5	13.2	14.2	13.7:	13.2
:						:	
5-10 :	1,779	1,485	4,300	5,970	2,683	20,114:	36,331
% :	13.0	11.9	10.8	13.7	13.9	15.3:	14.0
:						:	
11-15 :	347	330	800	1,146	497	4,322:	7,442
% :	2.5	2.6	2.0	2.6	2.6	3.3:	2.9
:						:	
>15 :	178	241	524	687	291	2,116:	4,037
% :	1.3	1.9	1.3	1.6	1.5	1.6:	1.6
<hr/>							
TOTAL :	13,676	12,516	39,783	43,599	19,281	131,105:	259,960
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	2.3	2.4	2.0	2.4	2.5	2.6:	2.5
S.D. :	3.7	4.5	3.8	4.0	4.0	4.0:	4.0

TABLE 29 : DENTAL VISITS BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

DENTAL VISITS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1 :	1,634	1,177	3,661	4,149	2,239	12,888:	25,748
% :	43.0	41.7	47.4	43.3	47.1	49.3:	47.0
:						:	
2 :	1,051	758	2,094	2,765	1,311	6,667:	14,646
% :	27.7	26.8	27.1	28.8	27.6	25.5:	26.7
:						:	
3 :	568	401	1,039	1,368	635	3,338:	7,349
% :	15.0	14.2	13.5	14.3	13.4	12.8:	13.4
:						:	
4 :	261	214	469	628	295	1,756:	3,623
% :	6.9	7.6	6.1	6.6	6.2	6.7:	6.6
:						:	
5-10 :	275	263	455	653	270	1,492:	3,408
% :	7.2	9.3	5.9	6.8	5.7	5.7:	6.2
:						:	
>10 :	10	12	3	24	2	20:	71
% :	0.3	0.4	0.0	0.3	0.0	0.1:	0.1
<hr/>							
TOTAL :	3,799	2,825	7,721	9,587	4,752	26,161:	54,845
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
<hr/>							
MEAN :	2.2	2.3	2.0	2.1	2.0	2.0:	2.1
S.D. :	1.5	1.7	1.4	1.5	1.4	1.4:	1.4

TABLE 30 : USUAL PROVIDER OF CARE BY HSA IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

TYPE-UPC :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
NO VISITS :	5,553	5,966	19,189	18,784	7,671	52,388:	109,551
% :	40.6	47.7	48.2	43.1	39.8	40.0:	42.1
:						:	
PRIVATE MD :	5,401	4,762	14,025	18,102	8,863	29,851:	81,004
% :	39.5	38.1	35.3	41.5	46.0	22.8:	31.2
:						:	
OPD :	50	397	1,042	2,451	401	35,281:	39,622
% :	0.4	3.2	2.6	5.6	2.1	26.9:	15.2
:						:	
ER :	1,978	943	3,684	2,463	1,522	7,163:	17,753
% :	14.5	7.5	9.3	5.7	7.9	5.5:	6.8
:						:	
COMBINATION :	694	448	1,843	1,799	824	6,422:	12,030
% :	5.1	3.6	4.6	4.1	4.3	4.9:	4.6
:						:	
TOTAL :	13,676	12,516	39,783	43,599	19,281	131,105:	259,960
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0

percent. Total payments by UPC are given in Table 31. For the 53.9 percent whose UPC was a private physician, average payments for users was \$375. For the 26.3 percent of users who were identified with hospital clinics as their UPC, the average medical assistance payment was \$707. The percentage of users in the other groups numbered under 20 percent. Payments amounting to about \$10 million not covered in this table were primarily for inpatient care where ambulatory services were not identified.

Table 32 displays the distribution of groups by Usual Provider of Care stratified by race. Of the total population of enrolled children, 31 percent use a private physician as the Usual Provider of Care. However, 40 percent of the white population make most of their visits to a private physician. Among those making use of the hospital outpatient department as their Usual Provider of Care this was observed for 7 percent of the white population and 80 percent of the non-white population. These distributions are influenced by place of residence and availability of medical care services to Medicaid patients. As previously noted Baltimore City has the largest number of hospital based outpatient clinics and the largest non-white population also.

In Table 33 distribution of hospital inpatient admissions by the Usual Provider of Care is displayed. While the hospital OPD is used by 26 percent of the population as their usual provider of care, almost 36 percent of the inpatient admissions came from that population. Consequently, inpatient admission may be used more frequently for that population than for any of the others. Specifically, 9.7 percent of the private physician provider population were hospitalized while 14.7 percent of the OPD population was hospitalized. Whether children using hospital OPDs have more severe illnesses or admission is more frequently used because of ready availability or that those originally hospitalized were more likely to be followed subsequently in an OPD, were not answered in this study. It is of considerable interest to note that those who use the emergency room as their usual provider of care had about the same percentage of admissions (8.4 percent) as the private physician group. This may suggest that the emergency room is used for many minor problems as well as more serious ones. The overall percentage of enrollees who were hospitalized is higher when an outpatient department is used as the usual source of care compared to a private physician.

In Table 34 payments for ambulatory services are compared for the Usual Provider of Care categories. Average payments for a child using a private physician was about

TABLE 31 : GRAND TOTAL PAYMENTS BY USUAL PROVIDER IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

TYPE-UPC :	MD	OPD	ER	COMB :	TOTAL	PRCNT
PAYMENTS :				:		
0 :	489	224	134	69 :	916	0.6
1-50 :	21117	6083	2740	736 :	30676	20.3
51-100 :	15605	6514	4763	3079 :	29961	19.8
101-200 :	18254	8790	4823	4105 :	35972	23.8
201-500 :	15333	9438	3421	2588 :	30780	20.3
501-1000 :	4421	3035	757	529 :	8742	5.8
1001-2500 :	4414	3544	850	685 :	9493	6.3
2501-5000 :	1228	1347	249	196 :	3020	2.0
>5000 :	629	871	149	112 :	1761	1.2
TOTAL :	81490	39846	17886	12099 :	151321	100.0
PRCNT :	53.9	26.3	11.8	8.0 :	100.0	
MEAN :	375.2	706.9	384.2	449.2 :	469.5	
S.D. :	1503.7	2560.4	1967.1	2168.6 :	1948.8	

TABLE 32 : TYPE-UPC BY RACE IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81

RACE :	WHITE	NONWHITE :	TOTAL	PRCNT
TYPE-UPC :				
NO VISITS :	38885	70666 :	109551	42.1
PRIVATE MD :	38705	42299 :	81004	31.2
OPD :	6734	32888 :	39622	15.2
ER :	6940	10813 :	17753	6.8
COMBINATION :	4488	7542 :	12030	4.6
TOTAL :	95752	164208 :	259960	100.0
PRCNT :	36.8	63.2 :	100.0	

TABLE 33 : NUMBER OF ADMISSIONS BY USUAL PROVIDER IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

TYPE-UPC :	MD	OPD	ER	COMB :	TOTAL PRCNT	
ADMISSIONS :						
1 :	6665	4979	1248	1036 :	13928	84.7
2 :	955	669	186	101 :	1911	11.6
3 :	205	138	36	30 :	409	2.5
4 :	41	57	13	6 :	117	0.7
5 :	18	18	5	2 :	43	0.3
6 :	11	4	5	1 :	21	0.1
7 :	3	4	0	0 :	7	0.0
8 :	3	2	2	0 :	7	0.0
9 :	1	3	0	0 :	4	0.0
10 :	0	1	0	0 :	1	0.0
>10 :	2	2	1	0 :	5	0.0
TOTAL :	7904	5877	1496	1176 :	16453	100.0
PRCNT :	48.0	35.7	9.1	7.2 :	100.0	
MEAN :	1.2	1.2	1.2	1.2 :	1.2	
S.D. :	0.6	0.7	0.8	0.5 :	0.6	

TABLE 34 : AMBULATORY PAYMENTS BY USUAL PROVIDER IN MARYLAND

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

TYPE-UPC :	MD	OPD	ER	COMB :	TOTAL	PRCNT
<hr/>						
PAYMENTS :				:		
:				:		
0 :	490	224	134	69 :	917	0.6
1-25 :	17595	2875	1014	126 :	21610	14.3
26-50 :	17828	6180	3298	1485 :	28791	19.0
51-100 :	16713	7547	5652	4397 :	34309	22.7
101-200 :	16017	9256	4477	3763 :	33513	22.2
201-300 :	6227	5076	1719	1185 :	14207	9.4
301-500 :	4433	4928	1093	758 :	11212	7.4
>500 :	2187	3760	499	316 :	6762	4.5
<hr/>						
TOTAL :	81490	39846	17886	12099 :	151321	100.0
PRCNT :	53.9	26.3	11.8	8.0 :	100.0	
<hr/>						
MEAN :	113.8	211.5	137.1	142.8 :	144.6	
S.D. :	161.5	289.1	203.6	151.4 :	210.9	

\$114 per year while for those making use of hospital clinics for that purpose the average yearly payments were \$212. Both the higher cost of hospital clinic care as well as the greater number of visits per patient to those facilities accounted for the higher average payments for that population compared to the private physicians population. Whether this also reflected greater severity of illness in the hospital clinic population is not known.

Utilization of Services and Payments for Comprehensive Care of Medicaid Recipients:

In the next several tables services and payments experience is described for Medicaid Eligible Children who attended a Title V Comprehensive Care Program called the Children and Youth Project (C&Y) at the Johns Hopkins Hospital (JHH). The C&Y Program was a free-standing clinic which served children in Census Tracts near the hospital and functioned for 8 hours a day, 5 days a week providing health supervision and acute and chronic illness care. About half the population registered in the program were Medicaid eligible while the others were medically indigent and just above scale therefore receiving services paid for with Title V funds. The Medicaid eligible registrants retained their general Medicaid cards so that they were free to use whatever provider they chose. However, they were urged to use JHH clinics and services if they required after hours care or special services. For each visit to the C&Y clinic by a Medicaid eligible child the C&Y Program received an all-inclusive fixed fee.

In the following tables utilization of services and payments for care are compared for Medicaid Eligibles using the C&Y Program who obtained all of their care through the program, for those who also used outside sources of care, for Baltimore City Medicaid Eligibles and for the State in general. One major hypothesis of the program is that those receiving comprehensive services at a single site of care are more likely to experience more appropriate levels of utilization and lower costs than other using multiple sites.

In Table 35 months of eligibility for the several eligible populations being compared are enumerated. For all Medicaid users across the State 60% were eligible for the entire twelve months while in Baltimore City the figure was 68%. For the C&Y population 76% had been eligible for the entire twelve month period suggesting that much greater commitment to the C&Y program existed and continuity of care was far more likely. A further stratification of the C&Y population is described in Table 36. Single site users made 74% of their hospital contacts with the C&Y clinic. Those who used multiple sources of care had only 42% of their

Table 35

Months of Eligibility for C&Y Patients, Baltimore City and Maryland Users.
Maryland, FY 1981.

	Months of Eligibility				
	1-3	4-6	7-11	12	Total
No. C&Y Patients	184	552	1,140	5,962	7,838
Percentage	2	7	15	76	100
No. Baltimore City users	3,457	8,511	16,323	60,194	88,485
Percentage	4	10	18	68	100
All Medicaid Users	9,672	22,468	36,968	104,796	173,904
Percentage	6	13	21	60	100

Table 36

Distribution of Total Visits by C&Y Patients⁽¹⁾ to Various Sites at JHH & Outside. Baltimore City, Maryland. FY 1981.

Visit Site	<u>Single Site Users</u>		<u>Outside Sites Used Also</u>		<u>Totals for all Sites</u>	
	(Pts.=5900)		(Pts.=1938)		(Pts.=7838)	
	N	%	N	%	N	%
1. JHH C&Y Clinic	21,391	74%	7,223	42%	28,614	62%
2. Other JHH Clinics	4,759	16	2,304	14	7,063	15
3. JHH ER	2,787	10	1,183	7	3,970	9
4. Outside Office	-	-	3,007	17	3,007	6
5. Outside Clinic	-	-	2,651	15	2,651	6
6. Outside ER	-	-	841	5	841	2
Totals	28,937	100	17,209	100	46,146	100

(1) A C&Y patient is defined as a child who made at least one visit to the Johns Hopkins Hospital (JHH) C&Y Clinic site.

ambulatory contacts with the hospital C&Y clinic. Consequently, there was a major difference in the site of care for the two populations and this was permitted by virtue of the Medicaid card designation. Utilization of services by age groups is described in Table 37. It is interesting to note that the mean number of the ambulatory visits for the single site users was almost half that compared with the multiple site users, an average of 4.1 visits compared with 7.8 visits. Emergency Room visits were also twice the number for the multiple site group compared with the single site users. Given the limitations of our data it is not clear if this represents more rational use of services by the single site group or more serious illness on the part of the multiple site users.

Hospital admission rates for the various populations being compared are described in Table 38. Admission rates across all age groups are strikingly different for the several populations being compared. The rate per thousand for the single site C&Y users was 87 while for multiple site C&Y users it was 245 and for all Baltimore City users it was 122. Again the data did not allow an analysis by severity of medical conditions which might have explained these differences. However the multiple site users have so many more hospitalizations than even the Baltimore City population that either more severe illness or inappropriate utilization must be considered to characterize this population. The tabulation of mean number of inpatient days per thousand Medicaid users is displayed in Table 39. Again the single site C&Y users have the lowest number of inpatient days while the multiple site users are several times greater and significantly above the figure for Baltimore City users. In Table 40 the previous calculations are reflected in much higher payments for the multiple site group of C&Y users. In Table 41 it is demonstrated that multiple site C&Y users require 74% of total payments for inpatient care while single site C&Y users require only 51% of total payments for that care. An effort is made to calculate the projected savings which might be realized, if all C&Y users made use of a single site of care, in Table 42. It should be noted that the payment calculations have been corrected for the discrepancy between actual costs and the inclusive Medicaid fee received by the C&Y clinic. The correction is described in the footnote to Table 42. If all C&Y Medicaid users used a single site of care a savings of 1.4 million dollars or \$183 per user would be realized. This supposition would require testing with more complete data detailing the nature of the multiple site user population.

Table 37

Ambulatory Visits and Emergency Room Visits for Single Site C&Y Users and C&Y Users with Outside Visits. Baltimore City, Maryland, FY 1981.

	Age Group, Years					
	<1	1-5	6-10	11-15	16-20	Total
<u>Single Site C&Y Users</u>						
No. of Patients	451	2,597	1,257	985	620	5,900
Total No. Ambulatory Visits ⁽¹⁾	2,210	13,592	3,942	3,299	3,107	26,150
Mean No. Ambulatory Visits ⁽¹⁾	4.9	5.3	3.1	3.3	5.0	4.4
Total No. ER Visits ⁽²⁾	151	1,458	534	374	270	2,787
Mean No. ER Visits ⁽²⁾	0.3	0.6	0.4	0.4	0.4	0.5
<u>C&Y Users with Outside Visits Also</u>						
No. of Patients	97	939	345	308	249	1,938
Total No. Ambulatory Visits ⁽³⁾	865	7,774	2,088	2,265	2,193	15,185
Mean No. Ambulatory Visits ⁽³⁾	8.9	8.3	6.1	7.4	8.8	7.8
Total No. ER Visits ⁽⁴⁾	85	1,027	293	311	308	2,024
Mean No. ER Visits ⁽⁴⁾	0.9	1.1	0.8	1.0	1.2	1.0

(1) Includes visits by C&Y patients to all JHH clinics including the C&Y Clinic as well as Specialty Clinics. ER visits are excluded.

(2) Includes visits to the JHH Emergency Room. These are not tallied with the previous item.

(3) Includes all ambulatory visits (except ER visits) to JHH sites, as well as to outside providers; i.e., office visits, clinic visits and Specialty visits.

(4) Includes visits to JHH ER as well as other hospital ERs.

Table 38

Admission Rates per 1000 Medicaid Users⁽¹⁾ for Baltimore City and for C&Y Users. Single Site C&Y Users Compared with Multiple Site C&Y Users. Baltimore City, Maryland, FY 1981.

		Age Group, Years					
		<1	1-5	6-10	11-15	16-20	Total
85	No. single site C&Y users	451	2,587	1,257	985	620	5,900
	Admission Rate per 1000	228	72	41	73	145	87
	No. Multiple Site C&Y users	97	939	345	308	249	1,938
	Admission Rate per 1000	496	254	99	199	370	245
	No. Baltimore City users	5,075	26,319	18,414	17,624	21,093	88,525
	Admission Rate per 1000	270	97	51	67	224	122

(1) "Users" served as the denominator for calculations of rates since C&Y patients could only be identified when they received Medicaid services.

Table 39

Mean Number of Inpatient Days per 1000 C&Y Users. Single Site Users Compared with Multiple Site C&Y Users. JHH C&Y, Baltimore City, Maryland, FY 1981.

	Age Group, Years					Total
	<1	1-5	6-10	11-15	16-20	
No. Single Site C&Y users	451	2587	1257	985	620	5900
Mean No. Inpatient days per 1000	3361.2	389.6	153.7	329.8	810	600.7
No. Multiple Site C&Y users	97	939	345	308	249	1938
Mean No. Inpatient days per 1000	8712.4	3668.6	1235.9	1191.6	2040.2	2885.1
No. Baltimore City users	5075	26,319	18,414	17,624	21,093	88,525
Mean No. Inpatient days per 1000	3430.5	837.3	383.0	502.5	1188.5	907.5

Table 40

Mean Payment per Medicaid C&Y Clinic User for those Using only the C&Y Hospital (Single Site User) and for those using other Providers also. JHH C&Y, Baltimore City, Maryland, FY 1981.

	Age Group, Years					Total
	<1	1-5	6-10	11-15	16-20	
No. Single Site C&Y users	451	2,587	1,257	985	620	5,900
Mean Payments(\$)	1,462	415	241	290	494	\$ 445
No. C&Y Patients using other providers	97	939	345	308	249	1,938
Mean Payments(\$)	3,432	1,422	495	691	1,001	\$1,187
All C&Y Users	548	3,526	1,602	1,293	869	7,838
Mean Payments(\$)	1,811	683	296	386	639	\$ 628

Table 41

Proportion of C&Y Total Payments for Inpatient Care. C&Y Single Site Users Compared with Patients using Other Providers also. JHH C&Y, Baltimore City, Maryland, FY 1981.

	Age Group, Years					Total
	<1	1-5	6-10	11-15	16-20	
No. of Single Site C&Y Users	451	2,587	1,257	985	620	5,900
Total Payments (000)	\$659.4	1,073.6	302.9	285.7	306.3	\$2,625.5
Inpatient Care Payments (000)	\$560.8	418.3	83.5	116.6	157.8	\$1,337.0
Percentage	85%		28	41	52	51
No. of C&Y Patients Using other Providers also	97	939	345	308	249	1,938
Total Payments (000)	\$332.9	1,335.3	170.8	212.8	249.2	\$2,300.4
Inpatient Care Payments (000)	\$291.4	1,008.2	106.4	125.3	165.2	\$1,696.5
Percentage	88%	76	62	59	66	74

Table 42

Medicaid Payments for JHH C&Y Users. Projected Savings if Single Site⁽¹⁾ Used.
Baltimore City, Maryland. FY 1981.

	No. Users	Mean Payment(2)	Total Payment for Group
All JHH C&Y Medicaid Users	7,838	628.8	\$4,928,534
C&Y JHH Single Site Users	5,900	445.4	2,627,860
Other Providers used also	1,938	1,187.1	2,300,674
(Projected Payments if all care provided at C&Y site)	7,838	445.4	(3,491,045)
(Projected Savings)			(\$1,437,489)

(1) Includes all related hospital facilities; i.e., C&Y Clinic, JHH ER, Specialty Clinics and Inpatient Services.

(2) As a Medicaid Free Standing Clinic, C&Y Clinic visits were paid at a fixed rate which was below calculated cost. Add \$37 to mean C&Y payment to approximate annual "cost".

Comparison of Service Utilization Before and After an Increase in Payments for Medicaid Physician Office Visits:

On July 1st of 1980 the Medical Assistance Administration significantly increased payments to private physicians who provided services for Medicaid Children. The impact of this change in office visit compensation was measured by studying utilization and payments for the six months prior to the fee increase compared with the six months starting with January 1st of 1981. This timing permitted a six month tooling-up period to allow private physicians to respond to the increase in fees. In Table 43 utilization of services during the before and after periods are displayed. Most notably the total number of users of office care increased by 13% between the two time periods while concurrently the number of private office visits increased by 23%. This occurred at a time when the increase in all users of ambulatory care escalated by 9%. Users and visits to see a Pediatrician are displayed in Table 44 for the before and after periods. The data are similar to those for all Office Visits but demonstrate the actual per user increase in the use of the pediatrician's office. The actual office fee payment experience for the before and after time periods are displayed in Table 45. Indeed, there was an overall 33% increase in payments for office visits which significantly exceeds the previous payment level.

It was hypothesized that with greater use of private offices total Medicaid payments might be reduced since more expensive emergency rooms and inpatient care were likely to be reduced by virtue of the opportunity for continuity of care. In Table 46 for the 6 month "after" study period there was a 7.9% reduction in total expenditures per user as predicted although the Central Maryland Countys excluding Baltimore City did not demonstrate such a reduction. Therefore the increase in private physician office fees appears to have accomplished some of what was hypothesized in that inappropriate utilization of emergency rooms and inpatient services were probably reduced and overall average user payments were also decreased.

Comparative Study of Charges and Medicaid Payments:

In Table 47 and 48 a comparison of office visit charges versus actual payments is displayed by age group. Overall about 73% of charges were paid by the Medicaid Program. In Baltimore City the discrepancy was greatest for the under 1 year age group where only 70% of charges were actually paid. These discrepancies may serve as a deterrent to provider participation in Medicaid services for children.

Table 43: Comparison of Ambulatory Services during the last six months of FY 1980 and the last six months of FY 1981. (Office Visit Payments were increased by the Medical Assistance Administration of Maryland on July 1, 1980).

	Before		After		Change (After-Before)	
	No.	%(1)	No.	%(1)	No.	%
Total No. of Users	119,032	--	132,345	--	13,313	+11
Users of Ambulatory Care	100,175	84	109,089	82	8,914	+9
Ambulatory Visits	270,473		294,540		24,067	+9
Users of Office Care	61,031	51	69,242	52	8,211	+13
Office Visits	150,397		184,770		34,373	+23
Users of OPD Care	38,605	32	38,810	29	205	+0.5
OPD Visits	92,652		93,144		492	+0.5
Users of ER	34,637	29	36,563	28	1,926	+6
ER Visits	48,492		51,188		2,696	+6

(1) Percentage of the total for the "Before" or "After" group of users.

Table 44: Comparison of visits to a
Pediatrician During Last Six
Months of FY 1980 and Last Six
Months of FY 1981. (Office visit
payments were increased on July 1, 1980).

	<1	1-5	Number of Visits by Age Group			Total
			6-20	11-15	16-20	
<u>Before</u>						
No. Users	2,562	7,332	3,604	2,326	926	16,750
Mean No. Visits	3.1	2.5	2.1	2.0	2.0	2.4
<u>After</u>						
No. Users	2,952	8,701	3,884	2,604	1,103	19,244
Mean No. Visits	3.5	2.7	2.3	2.2	2.1	2.6
<u>Difference</u>						
No. Users	+390	+1,369	+280	+278	+177	+2,494

Table 45: Comparison of payments for
office visits during last six
months of FY 1980 and last six
months of FY 1981 by HSA, Maryland.
(Office visit payments were increased
on July 1, 1980).

	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO	TOTAL
<u>Before</u>							
Mean per User	29.9	42.2	36.0	34.7	33.7	32.9	34.1
<u>After</u>							
Mean per User	42.0	56.5	52.7	45.9	43.5	41.5	45.5
<u>Difference</u>							
After- Before	+12.1	+14.3	+16.7	+11.2	+9.8	+8.6	+11.4
Prcnt Change	40%	33.9	46.4	32.3	29.1	26.1	33.4

Table 46: Comparison of total Medicaid payments by HSA for last six months of FY 1980 and last six months of FY 1981, Maryland. (Office visit payments were increased on July 1, 1980).

	Payments by HSA						
	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO	TOTAL
<u>Before</u>							
Mean per User	284.6	282.1	405.4	294.1	300.6	310.3	315.2
<u>After</u>							
Mean per User	265.6	269.4	317.3	293.5	274.1	292.5	292.1
<u>Difference</u>							
Before-After	19.0	12.7	88.1	0.6	26.5	17.8	23.1
% Decrease	6.7	4.5	21.7	--	8.8	5.7	7.9

Table 47

Office Visit Charges vs. Medicaid Payments. Maryland, FY 1981

	Age Group, Years					
	≤1	1-5	6-10	11-15	16-20	Total
No. of Users in Group	6,456	31,416	20,089	19,141	22,576	99,678
Mean Charges (\$)	102.1	90.0	70.0	74.6	87.3	83.2
Mean Payments	74.3	67.2	50.9	52.6	62.8	60.5
Excess of Charges over Payments (\$)	27.8	22.8	19.1	22.0	24.5	22.7
Percentage Paid (%)	73	75	73	71	72	73

Table 48

Office Visit Charges vs. Medicaid Payments. Baltimore City,
Maryland. FY 1981.

	Age Group, Years					
	0-1	1-5	6-10	11-15	16-20	Total
No. of Users in Group	2,067	12,303	8,274	7,912	9,861	40,417
Mean Charges (\$)	103.5	81.9	62.0	65.8	78.0	74.8
Mean Payments (\$)	72.0	60.6	46.0	47.3	59.3	55.1
Excess of Charges Over Payments	31.5	21.3	16.0	18.5	18.7	19.7
Percentage Paid	70	74	74	72	76	74

Dental Services for Children Under Medicaid:

As previously demonstrated in Table 29 only about 21% of Medicaid enrollees receive dental services. In Table 49 an effort is made to examine the percentage of enrollees making use of dental services compared with the availability of dentists in the area. Percentage of enrollees receiving dental services was surprisingly uniform across all HSAs including Baltimore City except for Western Maryland where the percentage reached 28%. Ranking each HSAs by the availability of dental resources did not correlate well with utilization and other factors must have been operative. Prophylactic dental services are examined in Table 50. At 17% the number of users of prophylactic services was slightly below the 21% for all dental services. Dental service by race displayed in Table 50a showed similar numbers of dental visits for users by race. Of all ambulatory care users dental visits were made by 40% of whites and 34% of non-whites.

The Impact of Health Supervision Services on Medicaid Payments:

Ideally, health supervision services including early identification of abnormalities, screening tests and immunizations are designed to prevent illness and more serious chronic disease changes by way of early identification. Theoretically, early identification of illnesses or abnormalities should prevent deterioration and more costly later care. Very likely several years of observing a cohort of children would be necessary to test these suppositions. However, the question was examined in the context of our current study. Two types of health supervision services are provided under Medicaid. The specifically mandated program is called the Early and Periodic Screening, Diagnosis and Therapy Program (EPSDT) (12) while payments are also made for health supervision services which presumably reflect the American Academy of Pediatrics Periodicity Schedule of Health Supervision (14) but which are not specifically mandated under the Medicaid Program. In Table 51 a group of 14,000 children who have at least one EPSDT office visit during the study year were tabulated by age against their average Medicaid payments for all services. The mean payment for all users averages \$470 for all users while the average for those with at least one EPSDT office visit was \$325. In Baltimore City total Medicaid payments by age for those with at least one EPSDT visit were similarly well below the expenditures for all users. As displayed in Table 52. When the same tabulations were made for children who had received at least one office health supervision visit as in Table 53 the total Medicaid payments were slightly higher than for all users. However, infants and preschoolers tend to have lower total payments

Table 49: Utilization of Medicaid funded dental services by children in Maryland, FY 1981. Number of dentists by HSA.

	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO	TOTAL
Enrolled Children, FY '81	13,676	12,516	39,783	43,599	19,281	131,105	259,960
No. of Users	3,799	2,825	7,721	9,587	4,752	26,161	54,845
Percent of Enrollees	(27.8)	(22.6)	(19.4)	(22.0)	(24.6)	(20.0)	(21.1)
Mean Visits per User	2.2	2.3	2.0	2.1	2.0	2.0	2.1
Mean Payment per User	\$79.3	\$116.3	\$78.4	\$79.2	\$71.9	\$67.7	\$74.9
No. of Dentists	136	482	337	555	116	548	2,189
Dentists per 1000 Enrollees	9.9	38.5	8.5	12.7	6.0	4.2	8.4
Rank order for Dentists	3	1	4	2	5	6	

Table 50: Utilization of Medicaid funded prophylactic dental services by children in Maryland, FY 1981.

	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO	MARYLAND
Users as % of Enrollees	(22.5)	(18.5)	(15.3)	(18.6)	(20.2)	(14.9)	(16.6)
Mean Visits Per User	1.3	1.2	1.2	1.3	1.3	1.2	1.2
Mean Payment Per User	\$40.4	\$52.4	\$40.5	\$41.5	\$42.6	\$39.6	\$41.1

TABLE 50a DENTAL VISITS BY RACE IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81

RACE :		WHITE	NONWHITE :	TOTAL PRCNT	
DENTAL VISITS :					
1 :	10028	15720 :	25748	47.0	
2 :	6301	8345 :	14646	26.7	
3 :	3268	4081 :	7349	13.4	
4 :	1553	2070 :	3623	6.6	
5-10 :	1544	1864 :	3408	6.2	
>10 :	37	34 :	71	0.1	
TOTAL :		22731	32114 :	54845	100.0
PRCNT :		41.5	58.6 :	100.0	
MEAN :		2.1	2.0 :	2.1	
S.D. :		1.5	1.4 :	1.4	

Table 51

Total Payments by Age where at least One EPSDT Visit was made During the Study Year, Maryland, FY 1981.

	Age Group, Years					Total
	<1	1-5	6-10	11-15	16-20	
No. with EPSDT						
Office Visit	1,185	5,379	3,329	2,934	1,409	14,236
Mean Payments (\$)	832.5	342.5	190.6	213.4	381.5	325.0
Mean Payments for						
All Users	1209.0	420.1	265.0	309.0	660.7	470.4

TABLE 52 : TOTAL PAYMENTS BY AGE WITH EPSDT VISIT IN BALTIMORE CITY

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81

EPSDT VISIT :
 1+ : 1 TO 99

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRCNT
PAYMENTS :							
1-50 :	93	914	864	835	398 :	3104	26.8
51-100 :	141	774	617	495	161 :	2188	18.9
101-200 :	208	1128	782	605	242 :	2965	25.6
201-500 :	164	977	475	451	275 :	2342	20.2
501-1000 :	37	164	60	72	76 :	409	3.5
1001-2500 :	79	157	45	59	69 :	409	3.5
2501-5000 :	26	46	7	12	24 :	115	1.0
>5000 :	26	26	5	5	8 :	70	0.6
TOTAL :	774	4186	2855	2534	1253 :	11602	100.0
PRCNT :	6.7	36.1	24.6	21.8	10.8 :	100.0	
MEAN :	804.1	316.2	183.3	200.7	373.3 :	297.0	
S.D. :	2278.0	954.7	714.2	556.7	1072.9 :	1007.5	

Table 53

Total Payments by Age where at least One Office Health Supervision Visit was made during the Study Year. Maryland, FY, 1981.

	Age Group, Years					
	<1	1-5	6-10	11-15	16-20	Total
No. with Office Health Supervision Visit	4,062	13,876	4,860	4,570	9,041	36,409
Mean Payments (\$)	845.3	381.6	268.9	356.8	765.4	510.5
Mean Payments for All Users	1209.0	420.1	265.0	309	660.7	470.4

than for all users. It is unknown why the total payments are so strikingly different for those receiving an EPSDT service versus those under health supervision. Perhaps the content of the health supervision visit was different from that of the EPSDT visit or those who went for EPSDT screening services were a selected population with less serious illnesses. Only 14,236 children received EPSDT screening services or 8% of total users. If both health supervision and EPSDT visits are combined 29% of users are calculated to use such services or 19.5% of all enrollees. Whether health supervision visits include the same content or not, as EPSDT services is unknown but judging from these findings the question deserves exploration.

The Impact of Extended Continuity of Care on Utilization of Services and Medicaid Payments:

Continuing health supervision of infants and children presumably leads to improved health and by extrapolation lower costs for health care (15). Consequently, children who have been in the Medicaid Program for an extended period are expected to have lower Medicaid payments than those who wait until some acute or chronic problem requires care. However, even though access to medical care appears to have been improved by the Medicaid Program many parents still seek care for their children only when illness finally makes it unavoidably necessary (16). These data files offered an opportunity to examine this question where higher Medicaid payments serve as a proxy for more serious and extended illness.

For purposes of the study several populations were identified by age and length of enrollment in the program so that the payments for care of new users could be contrasted with those for children who had been in the program for an extended period. The hypothesis to be tested was that payments for children who had been in the program for an extended period were lower when age adjusted than for those who were newly eligible users. In Table 54 average payments for users are displayed for the entire population, new users enrolled during the study year, new users who are at least two years of age or older at the time of initial eligibility and old users or extended care users who had been enrolled for at least 12 months prior to the study year. Average payment for all users was \$470 while for new users enrolled during the study year this was \$723. However, those infants and children enrolled for at least twelve months prior to the study year had average payments of \$357 while a group of two year olds who were newly eligible for services showed mean payments of \$526. Comparing these later two groups rather than all new users excludes the newborns and infants

Table 54

Mean Payments⁽¹⁾ by Months Enrolled in the Medicaid Program during the Study Year for all Users, New Users, New Users Two Years of Age or Older and Previously Enrolled Patients. Maryland, FY 1981.

	Months Enrolled during Study Year				
	1-3	4-6	7-11	12	Total
Total No. Users	9,672	22,468	36,968	104,796	173,904
Mean Payments(\$)	454	512	564	430	470
New Users Enrolled during Study Year	5,999	12,931	16,184	2,626	37,740
Mean Payments(\$)	570	667	782	977	723
New Users Two Years of Age or Older	3,628	8,778	11,195	1,868	25,469
Mean Payments(\$)	387	492	570	689	526
Old Users Enrolled for at least 12 Mos. prior to Study Year	1,959	5,962	13,820	80,861	102,602
Mean Payments(\$)	237	275	339	369	357

(1) Includes all Medicaid payments; i.e., for hospital care, ambulatory visits, prescriptions, etc. during the indicated number of months enrolled.

who may require very costly care and push up the average figure for all new users.

Consequently, extended care or continuing care does appear to lead to reduced Medicaid payments when compared to newly eligible age mates. An alternative hypothesis might also apply whereby the older new users have exhausted health benefits because of serious or extended illness. This supposition could not be tested here. In Table 55 mean payments are examined by age group and again the extended care group has the lowest figure at \$369. The admission rate per 1000 users by age group is displayed in Table 56. For the group of users who were two years of age or older there were significantly more admissions per thousand than for the extended care group. Inpatient days per thousand users by age group for the same populations are tabulated in Table 57. Similar differences are observed. In Table 58 the number of ER visits per thousand users is again examined for the three populations previously referred to. The extended care group makes less use of the emergency room than do the other groups.

Asthma in a Population of Medicaid Children:

Asthma was selected as a marker for examining the adequacy of care using data elements present in these administrative files. High prevalence, excessive use of the emergency room and hospitalizations for asthma were identified as adverse conditions in the C&Y population cited in this study (17). The following tables and the study described in Appendix D, attempt to examine the feasibility of this approach.

The diagnostic code for asthma used in billing invoices includes other respiratory conditions such as pneumonia and bronchitis as well as related problems. Consequently, in order to increase the specificity of the diagnosis despite this inclusive code, bronchodilators must also have been prescribed for the patient. The respiratory disease diagnostic code and national drug codes were examined for arriving at the diagnosis for purposes of this study. In Table 59 individuals identified with the diagnosis asthma are enumerated by age and sex. The total number of individuals with asthma is given as 3744. If the prevalence of asthma is estimated at about 3% for this childhood population then about 7800 individuals might have been counted. Consequently, the algorithm for identifying asthmatics may not be adequate or use of the codes on invoices was erratic or incomplete. As observed by others there is a preponderance of males in this diagnostic grouping. Displayed in Table 60 duration of eligibility for asthmatics is longer by about two months than for other

Table 55

Mean Payments by Age Group for all Users and for those Receiving Extended Care (12 Months Coverage during the Study Year and 12 Months of Prior Enrollment). Maryland, FY 1981.

	Age Group, Years					
	<2	2-5	6-10	11-15	16-20	Total
Total No. Users	24,030	38,009	36,267	35,120	40,565	173,991
Mean Payments(\$)	878	355	265	309	661	470
Total No. Users 2 years of age or older	-		(As Above)			149,961
Mean Payments(\$)	-					405
No. in "Extended" Care group	-	21,020	21,740	21,738	16,363	80,861
Mean Payments(\$)	-	\$375	282	310	554	369

Table 56

Admission Rate per 1000 by Age Group for all Users, Patients Two Years of Age or Older and for those receiving "Extended" Care (12 Months Coverage during the Study Year and 12 Months or more of Prior Enrollment). Maryland, FY 1981.

	Age Group, Years					Total
	<2	2-5	6-10	11-15	16-20	
Total No. Users	24,030	38,009	36,267	35,120	40,565	173,991
Admissions per 1000	230.0	87.9	60.1	68.3	240.0	130.8
No. Users 2 Years of age or older	-		(As Above)			149,961
Admissions per 1000	-					117.7
No. in "Extended" care Group	-	21,020	21,740	21,738	16,363	80,861
Admissions per 1000	-	91.9	60.3	67.6	157.7	90.2

Table 57

Inpatient Days per 1000 Users by Age Group for all Users, Patients Two Years of Age or Older and for those Receiving "Extended" Care (12 Months Coverage during the Study Year and 12 Months or more of Prior Enrollment). Maryland, FY 1981.

	Age Group, Years					Total
	0-1	2-5	6-10	11-15	16-20	
Total No. Users	24,030	38,009	36,267	35,120	40,565	173,991
Inpatient Days per 1000 users	2266.7	624.9	392.5	481.4	1271.3	925.5
No. Users Two Years of age or older	-		(As Above)			149,961
Inpatient Days per 1000 users	-					711.0
No. in Extended Care group	-	21,020	21,740	21,738	16,363	80,861
Inpatient Days per 1000 users	-	644.8	391.2	451.9	890.8	574.5

Table 58

Number of Emergency Room Visits by Number of Months Enrolled for all Users, Users Two Years of Age or Older and for Users receiving "Extended" Care (12-Month Coverage during the Study Year and 12 Months or More of Prior Enrollment). Maryland, FY 1981.

	Months Enrolled				
	1-3	4-6	7-11	12	Total
Total No. Users	9,672	22,468	36,968	104,796	173,904
ER Visits per 1000 Users	196.9	292.0	486.6	560.2	489.7
Total No. Users Two Years of Age or Older	7,078	17,838	31,102	100,686	156,704
ER Visits per 1000 Users	207.3	291.4	442.8	519.1	463.9
Total No. in Extended Care Group	--	--	--	80,861	--
ER Visits per 1000 Users				502.5	

TABLE 59 ASTHMA BY AGE AND SEX IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81
 ASTHMA :
 YES : 1 TO 1

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRCNT
SEX :							
MALE :	120	1027	476	380	183 :	2186	58.4
FEMALE :	70	643	299	262	284 :	1558	41.6
TOTAL :	190	1670	775	642	467 :	3744	100.0
PRCNT :	5.1	44.6	20.7	17.2	12.5 :	100.0	

TABLE 60: ASTHMA BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

ASTHMA :

YES : 1 TO 1

SMONTHS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
1-3 :	3	2	7	5	3	14:	34
% :	1.9	1.1	1.3	0.9	0.7	0.8:	0.9
:						:	
4-6 :	14	14	32	39	53	82:	234
% :	8.9	7.4	6.1	6.8	12.1	4.4:	6.3
:						:	
7-11 :	46	38	113	129	103	289:	718
% :	29.1	20.0	21.7	22.4	23.4	15.6:	19.2
:						:	
12 :	95	136	369	403	281	1,474:	2,758
% :	60.1	71.6	70.8	70.0	63.9	79.3:	73.7
TOTAL :	158	190	521	576	440	1,859:	3,744
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0
MEAN :	10.5	10.9	10.9	10.9	10.4	11.2:	11.0
S.D. :	2.4	2.1	2.1	2.1	2.4	1.9:	2.1

users. The calculated prevalence rate for the entire population was 21.5 per thousand with fairly uniform rates across all HSAs with two variations, the Eastern Shore at 32 per 1000 and Western Maryland 16 per 1000. Mean total payments for asthmatics was \$921 as displayed in Table 61 and ambulatory visits were more than double those without asthma.

In Appendix D is described a further study to identify gross measures of the adequacy of care for asthma. A Medicaid population of asthmatics is compared with a middle class HMO health plan population. Similar measures of severity were identified for the two populations but the hospitalization experience was markedly greater for Medicaid children. Therefore, despite the similarity in measures of severity HMO medical plan children were spared hospitalizations for asthma while the Medicaid population required a significant number of admissions.

Testing Some Basic Standards of Care:

In the following section various medical problems are examined using simple measures across HSAs. Identification of these specific conditions was obtained from the Diagnostic Code entered onto the billing invoice. There was no verification of these by comparing invoices with office or hospital records and providers were not queried to determine their understanding of the particular term used. At the time of the study only about 100 Diagnostic Codes were used for Medicaid Billing Invoices. Therefore many diagnostic conditions were lumped together into large, often diverse groups which reduced the specificity of these codes. Consequently, what follows is an example of how the claims data might be used. However, it will be essential to assure adequate verification of diagnoses by sample chart review or other techniques.

The use of Tetracycline by age group - Tetracycline is an antibiotic which under most circumstances should not be used in young children particularly those under the age of about 9 years because Tetracycline is incorporated into developing teeth and damages their structure (18). For purposes of this tabulation an age limit of 3 years was used for studying the utilization of Tetracycline. In Table 62 thirty-two children 3 years of age or under were observed to have received Tetracycline. Above that age 3,622 children received Tetracycline for various reasons but probably with slightly less potential danger to their developing teeth.

The use of antibiotics for children with Upper Respiratory Infections - Upper Respiratory Infections, the formal name for the common cold and related conditions, is

Table 61: Total payments and Ambulatory
Visits by Medicaid children
With asthma, Maryland, FY 1981.

	Asthma	
	Yes	No
No. of Users	3,743	170161
Mean Total Payments	\$920.7	\$460.6
Mean Ambulatory Visits	9.9	4.2
Mean Ambulatory Payments	\$293.6	\$140.6

TABLE 62: TETRACYCLINE BY AGE AND RACE IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81

TETRACYCLINE :
 YES : 1 TO 1

AGE :	<3	3-20 :	TOTAL PRCNT	
-----+-----+-----				
RACE :		:		
:		:		
WHITE :	23	1530 :	1553	42.5
NONWHITE :	9	2092 :	2101	57.5
-----+-----+-----				
TOTAL :	32	3622 :	3654	100.0
PRCNT :	0.9	99.1 :	100.0	
-----+-----+-----				

caused by nonbacterial agents and in its usual form is not cured or ameliorated by antibiotic therapy (19). However, in about 10 to 15 percent of children with URIs certain bacterial complications occur and deserve antibiotic therapy (19a). In Table 63 the presence or absence of a prescription for antibiotic therapy for those with URIs is tabulated by HSA. Of the 47,316 children who were identified as having URIs in the file about half received antibiotics. Baltimore City had the lowest occurrence of antibiotic usage with URIs while the other HSAs averaged about 56%. These high levels of URI-antibiotic usage may represent inappropriate practice or more serious disease in this population or some other quirk of the data which is not immediately apparent. As noted earlier a sample audit of medical records would be needed to verify the validity of these findings. However, it is clear that various clusters of patients, providers, geographic areas or other parameters could be stratified for such study of possible inappropriate use of antibiotics in URIs.

Chloramphenicol use in children with URIs - Chloramphenicol is an antibiotic of great value but with certain rare but serious adverse reactions (18). Consequently, it should only be used for certain serious and highly specific problems. The records of the 47,316 children with URIs were reviewed seeking prescriptions for chloramphenicol. None were found.

Penicillin Prophylaxis in Rheumatic Heart Disease - Rheumatic fever is a disease which may cause damage to the valves and tissues of the heart. This damage follows streptococcal infections which if they recur in such individuals may do further damage. Consequently, most patients with a history of rheumatic fever should be receiving penicillin prophylaxis on a regular basis to prevent recurrent streptococcal infections. In Table 64 it is noted that 454 children were identified as having had rheumatic fever either acutely or in the past. Of this number only 25% appeared to be receiving penicillin prophylaxis. The deficiency was not only in the older age group but also in younger children where the prophylaxis was more clearly indicated. Again to verify these findings a sample record audit would be needed to examine possible explanations for the fact that only about 25% of rheumatics were receiving prophylaxis as determined in these claims files.

Pregnancy outcomes by HSA - Theoretically, the ready availability of prenatal care throughout the State should reduce the number of adverse outcomes as they relate to the newborn. Therefore, birth outcome may be a sensitive

TABLE 63 : ANTIBIOTICS FOR URI BY HSA IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

URI :

YES : 1 TO 99

ANTIBIOTICS :	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
YES :	1,768	1,380	3,567	6,144	2,332	8,526:	23,717
% :	58.2	55.8	52.7	60.9	58.2	40.7:	50.1
:						:	
NO :	1,270	1,092	3,203	3,945	1,678	12,411:	23,599
% :	41.8	44.2	47.3	39.1	41.9	59.3:	49.9
:						:	
TOTAL :	3,038	2,472	6,770	10,089	4,010	20,937:	47,316
PRCNT :	100.0	100.0	100.0	100.0	100.0	100.0:	100.0

TABLE 64: PENICILLIN FOR RHD BY AGE IN MARYLAND

SMONTHS :

1-12 : 1 TO 12

BYEAR :

60-81 : 60 TO 81

RHEUMATIC F/H :

YES : 1 TO 9

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRCNT
PENICILLIN :							
YES :	6	66	15	14	11 :	112	24.7
NO :	13	120	60	56	93 :	342	75.3
TOTAL :	19	186	75	70	104 :	454	100.0
PRCNT :	4.2	41.0	16.5	15.4	22.9 :	100.0	

indicator of the availability and quality of prenatal care in various areas of the State. In Table 65 the occurrence of birth injuries and dysmaturity, mainly prematurity, are tabulated by HSA. The occurrence of birth injuries varied widely from 34% in Baltimore City to 73% in Montgomery County. Dysmaturity was far more uniform varying from only 21% in Western Maryland and the Central Maryland area to 28% in Southern Maryland which includes Prince George's county. These percentages are inexplicably high but again require sample audits of records to better understand the observations. An alternate supposition is that where birth injury or dysmaturity occurred a disproportionate number of families sought Medicaid Certification because of the very high hospital bills generated. Therefore, this may be a highly biased population regarding pregnancy and delivery. Eligibility and certification may favor those with serious medical problems which very likely encourages those with sick babies and large hospital bills to seek Medicaid certification and payments.

Audiometric testing after Otitis Media - A significant number of children with Otitis Media subsequently often develop persistent fluid in the middle ear. Middle ear effusions may lead to conductive hearing loss which may not be permanent but can last for some time. Consequently, audiometric or preferably tympanometric testing should be carried out in those 19% of children who have persistent middle ear effusion (45). This is particularly important for those starting school because of the adverse effect of even minimal hearing loss in that setting. In Table 66 it is noted that of the 19,891 individuals with Otitis Media only about 1% were followed up with hearing testing of any variety. This percentage is much too low and suggests that, very likely, a significant number of children with prior Otitis Media suffer from undetected conductive hearing loss. Validation of this finding also requires sample chart reviews to verify the claims data information.

TABLE 65: Deliveries by HSA and the Occurrence of Birth "Injuries" and Dysmaturity, Maryland Medicaid, FY1981.

	WM	MC	HSA		ES	Balt	Total
			SM	CM			
Deliveries	354	193	889	841	476	2536	5289
Birth "injuries"	160	141	441	397	212	863	2214
(%)	(45)	(73)	(50)	(47)	(45)	(34)	(42)
Dysmaturity	75	51	253	179	120	613	1291
(%)	(21)	(26)	(28)	(21)	(25)	(24)	(24)

TABLE 66 : AUDIOMETRY FOR OTITIS BY AGE IN MARYLAND

SMONTHS :
 1-12 : 1 TO 12
 BYEAR :
 60-81 : 60 TO 81
 OTITIS :
 YES : 1 TO 9

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL PRCNT	
AUDIOMETRY :							
YES :	3	106	79	24	12 :	224	1.1
NO :	1592	10997	3323	2093	1662 :	19667	98.9
TOTAL :	1595	11103	3402	2117	1674 :	19891	100.0
PRCNT :	8.0	55.8	17.1	10.6	8.4 :	100.0	

DISCUSSION

For purposes of this study Medicaid Eligibility and Claims Data were converted to specially defined files which permitted cross tabulations and analyses not readily possible with the original MMIS files. Study files were generated by developing specific variables which lent themselves to rapid processing according to the suppositions enumerated in the original proposal. Salem and Connell (6) and Connell and Mascovice (20) have described somewhat similar approaches to preparing analyses of Medicaid administrative data. However, in this study only computer generated Eligibility and Claims data were examined with no verification of original sources so that the accuracy of the data particularly in regards to diagnoses was not verified. A limited number of measures of internal consistency discussed earlier were studied and found to be surprisingly consistent. Audits of paper source documents or invoices were not examined for purposes of verifying accuracy of data entry.

The determination of total number of enrollees in the Medicaid Program for the fiscal year under study was calculated differently from the technique used in the Medicaid Agency Annual Report. In Table 1 the State Medical Assistant Program Report for Fiscal Year 1981 indicates that the total number of infants, children and adolescents certified as eligible for services during that time period was 199,205. According to the text of the report this number is arrived at by calculating the average number of certified eligibles from the data for each month. For accounting purposes where expenditures per certified enrollee must be calculated for an average caseload this is a very useful approach. However, for purposes of this study an individual who at any time during the Fiscal Year was certified for services and appeared in the Eligibility File was counted as an enrollee. This number as shown in Table 2 and in subsequent tabulations amounted to about 260,000 or almost 61,000 more than given in the Medicaid Annual Report. Connell and Mascovice (20) recognized similar differences in the approach to data analysis and described a population-based analysis to account for a different denominator.

Using Annual Report data the percentage of the Maryland childhood population certified for Medicaid Services was 14.2%. If study data are used the number of children who at any time during the year were eligible for services amounted to 18.5% of the total childhood population. Calculating the average number of eligibles per month is useful for financial accounting purposes but for examining the

utilization of services the study total provides more revealing information. According to Annual Report Data only 12% of eligibles failed to receive any services. However, using study totals for the number of eligible children about 33% failed to receive services during the year even though they were certified and entered into the Eligibility File. The gap in utilization of services is almost three times greater when based on the number ever eligible for services during the fiscal year.

In examining data by geographic area within the State the Health Service Area (HSA) designation was used as displayed in Table 2 and subsequently. However, in all instances where these geographic designations were used, study data for Baltimore City were displayed separately from the central Maryland HSA.

The Medicaid Program is shown to be a major third party payor for services to children in many parts of the State. In Baltimore City 27% of all children and adolescents were enrolled in the Medicaid Program at some time during the study year. For the remainder of the State, of the total childhood population 11.2% were enrolled in the Medicaid Program. For the non-white population, displayed in Table 2b, 60.8% of the total population of children and adolescents were enrolled in the Medicaid Program. In addition it is striking that for certain age groups particularly those aged 5 years and under enrollment was quite high particularly in Baltimore City but also in some of the Eastern Shore counties. Indeed, in Baltimore City for the non-white population, shown in Table 2b, 70.7% of those under a year of age were enrolled in the program while for those 1 through 5 years of age 86% of the total population of children were enrolled in the Medicaid Program. These very substantial proportions of the childhood population emphasize the importance of the Medicaid program in funding health services for poor children, a reality stressed by others also (15).

Perhaps of equal interest would be the total number of children and adolescents actually eligible for Medicaid certification by virtue of family size and income. Such information would tell much about the adequacy of outreach by the Medicaid Program in reaching those who are potentially eligible. Unfortunately it was not possible to calculate this proportion with the available data.

In the next several tables duration of eligibility certification is examined. An important question regarding the eligibility issue is whether or not there is a core population of enrollees who remain eligible over an extended

period. If this proved to be the case then special services might be offered for this population as well as extended periods of enrollment to reduce the workload for eligibility workers and to improve continuity of care for participants. Tables 6 and 6a show total elapsed time from date of initial certification to the end of the study year compared with the total number of months of actual Medicaid certification. These numbers are quite similar. In fact, the total time elapsed is 43.4 months while average length of enrollment in the Medicaid Program is 40 months. Other groupings are similar suggesting that a significant number of enrollees remain in the program over an extended period and do not go on and off eligibility.

Prior to the onset of the study year 23.4% had no prior certification in the Medicaid Program. About 38% of enrollees had three or more years of certified eligibility prior to the onset of the study period. Calculating the number of those who were newly enrolled in the program and were not newborns indicates that only 18.9% fell in this category. Therefore, examining Table 7 and 8, 60,803 had no prior Medicaid experience but 14,389 were newborns. This leaves 46,414 with no prior Medicaid experience of the total of 245,756 which excludes newborns.

Of those with 12 full months of eligibility during the study year 74% had at least 12 months of prior eligibility suggesting that a core population of enrollees exists who could be identified from periodic review of Eligibility Files. Another way of finding the core population is by identifying those who had 12 months of prior eligibility as well as a full 12 months of eligibility during the study year. This number amounted to 40% of the total number certified for eligibility during the study year or 104,096. Such extended eligibility offers an opportunity for implementing strategies to ensure continuing care which has been shown to offer many medical care benefits for participants (21). Wilensky and Berk (22) in an analysis of data from the 1977 National Medical Care Utilization and Expenditure Survey (NMCUES) which provided national estimates of health services, found that those continuously certified for Medicaid for one year had the highest utilization rates of the poor and near poor populations they studied.

Calculation of total annual payments for care served as an approximate measure of the intensity of services provided. As illustrated in Tables 12 and 12a, a relatively small number of users accounted for a very large percentage of total payments for children's Medicaid service. Indeed, 9.3% of all users during the study year accounted for 68.6%

of Medicaid expenditures for children's services. Carrying these calculations even further, 1.2% of total users or 2085 individuals accounted for 33.7% of total payments. These very costly individuals deserve much more attention. It is also noteworthy that judging from the zero payment line in Table 12 33.1% of registrants received no services. This proportion of non-users is surprisingly similar across the several HSAs despite large differences in the availability of medical resources. In the NMCUES study (23) of those individuals across all population groups under 19 years of age about 25% had no ambulatory contacts. Data from State Medicaid Household Surveys were also analyzed by expenditures per person and found distributions similar to those in Table 12a. In these NMCUES analyses of those enrolled only in Medicaid 5% of recipients accounted for 49.8% of expenditures or 10% were responsible for 64.3% of expenditures (23a).

Average payments for Medicaid Services were surprisingly similar across HSAs. The average payments in Table 12 are based on total number of enrollees rather than users. Highest average payments were recorded for Baltimore City, Montgomery County and the southern Maryland HSA. The largest contributor to data for the Southern Maryland area is Prince George's County which along with Montgomery County reflects the higher rates seen in the Washington Metropolitan area.

Payments by age in Table 13 reflect the fact that Medicaid is a very significant payor for sick newborns and infants who require lengthy hospitalizations and expensive care. The \$909 average payment for enrollees under one year of age and the very large standard deviation for this mean emphasizes the costliness of neonatal intensive care and infant care provided for this population. Indeed 6% of users account for 16% of total payments emphasizing the high payments per individual under one year of age as emphasized by McManus and Davidson (24). As demonstrated in Table 14 total payments by race are similar for whites and nonwhites. Health insurance coverage for this low income population is extremely limited as documented in Table 15. Only 8.3% of white children have other health insurance coverage while only 3.7% of non-white individuals have similar coverage. Anecdotally, it appears that these insurance programs are quite inadequate for children in that preventive care is rarely covered and newborns may not be adequately covered until well into the first year. These tabulations serve to emphasize the importance of the Medicaid Program to this population of low income children.

During the study year several prepaid Medicaid HMOs were in operation, particularly in the Baltimore Metropolitan Area. The Medicaid Program paid a fixed amount to the health care plan to provide ambulatory services to their health plan registrants. However, only 4.8% of Medicaid enrollees were covered by such programs. This was a surprising finding in that great stress had been placed on the value of prepaid managed care for children in low income families.

The following set of Tables Nos. 17 through 20, describe Medicaid funded inpatient care for the State of Maryland but allow comparisons from one HSA to another. Initially, it was presumed that the availability of medical care resources, particularly hospital beds, would significantly influence utilization patterns (25, 26). However, this did not appear to be wholly the case. Indeed, there may have been an inverse relationship between the availability of certain medical resources and utilization. For example in Table 17 the rural areas of Western Maryland and the Eastern Shore show average number of in-patient days per 1000 enrollees at much higher levels than the other HSAs. In both areas the percent of users resorting to in-patient care approached 10% compared with somewhat over 7% in other areas. Perhaps this is a reflection of limited resources as well as the great distances between facilities. It may mean that hospitalization was resorted to more readily than in metropolitan areas where medical services were more readily accessible (8). Indeed this supposition is supported by the fact that hospitalizations were generally of briefer duration for the rural areas of Western Maryland and the Eastern Shore. These observations are consistent with those of others who found hospitalization rates for Medicaid recipient above those for the near-poor non-Medicaid population (22,24,27,28).

Evidence provided in Table 18 indicates that the age group under one year of age demonstrates much higher use of inpatient facilities and for longer periods of time than other age groups. Table 19a illustrates the fact that even though periods of eligibility during the study year might vary from one to three months up to twelve months the average number of days of in-patient care were surprisingly similar. An increasing length of Medicaid eligibility did not necessarily correlate with an increase in the average number of days of hospitalization. Therefore, it appears that certification for the Medicaid Program might have been initiated by a costly episode of in-patient care, as noted by others (27). This question will be explored in more detail in a later section.

In the descriptive data presented in study Tables 21 through 25 it is quite apparent that much ambulatory care is provided by practicing physicians in their private offices. Of the total number of users about 58,000 made use of hospital or free standing clinic facilities while almost 100,000 visited physicians' offices. Probably the availability of hospital clinic resources influenced this utilization pattern in that the Baltimore City area illustrates far greater clinic use than all other HSAs (27,29). Table 3 displayed tabulations of the availability of physicians and other health care resources in the several HSAs. Pediatricians are fairly well represented in Metropolitan areas of the State but account for only about 28% of users of ambulatory services. Of those who visited a pediatric practice the average number of visits was considerably higher than for office visits in general. Perhaps those who visited pediatricians were more motivated and made many more preventive care office visits than others in the population.

The allegation is often made that Medicaid patients shift sites of service frequently and indulge in "doctor shopping" (16). On a proportionate basis this seems not to be the case in the current study population as demonstrated in Table 25a. 82% of users made use of no more than one or two different medical care facilities. Consequently, there appears to be a significant degree of consistency and continuity by patients in their use of health care resources. Similar findings were reported for the National Medical Care Utilization and Expenditure Survey where Leicher (30) noted similar sources of care for Medicaid and private care patients except for greater clinic use in the former group.

Emergency room utilization was explored in Table 26. Using the total number of patients making use of ambulatory facilities from Table 25a, it is possible to calculate the percentage of the user population who visited an emergency room in each HSA. In Western Maryland this figure was 39.3%, in Montgomery County 33.3%, Southern Maryland 45.1%, Central Maryland excluding Baltimore City 34.7%, the Eastern Shore 39.9%, Baltimore City 29.6% and for the State as a whole 34.8%. Baltimore City with its wealth of ambulatory care resources had the lowest percentage use of emergency rooms. Rural areas of the State including Western Maryland, Southern Maryland and the Eastern Shore where medical care facilities are far less plentiful and at greater distances the rates of emergency room use were highest. Consequently, it appears that where alternatives were available families preferred to use regular providers rather than emergency rooms. Indeed, even for those that did make use of ERS 66%

made only 1 visit and 87% made 2 or fewer visits to such facilities. In general, Medicaid users did not make excessive demands on emergency rooms and only a small percentage of the total demonstrated high rates of use. Of the total number of ambulatory care users only 2.9% or 1,533 made 5 or more visits to an emergency room. This observation is at variance with the usual description of low income families that make excessive demands on the ER. However, the NMCUES study (23a) also noted limited ER uses but Fleming and Jones (31) observed higher costs for OPD/ER oriented patients not only for individual ER visits but also for total costs particularly hospitalizations. Davidson (31a) and Hilker (31b) explore explanations for ER use in low income populations.

In the descriptive section the EPSDT Program (Early and Periodic Screening, Diagnostic and Treatment Program) will be mentioned only briefly. Using the total number of ambulatory care users as the denominator only 9.5% made use of the EPSDT Program. However, at this point in time Health Departments who were carrying out a substantial number of EPSDT screens did not report through the MMIS system. EPSDT screens which were billed through the MMIS system primarily originated with private providers and certain clinic facilities. In their 1981 annual report the Medical Assistance Administration estimated that more than 50,000 EPSDT screens took place in the state so that less than a third were recorded in the data system (9). The five Children and Youth Projects in Baltimore City recorded 28,390 EPSDT screens (17) during the year which were paid through the MMIS System so that the vast majority were carried out in Baltimore City medical care facilities. Therefore, relatively few screens were done elsewhere in the State and the effort to provide early identification of illness and abnormalities through the EPSDT Program was quite limited. Others have documented in considerable detail the many limitations and inadequacies of the EPSDT Program as it was initiated and administered in the various States (12, 32, 33). The impact of the program on other aspects of care will be discussed in a later section.

For the State as a whole children certified for the Medicaid Program, both users and non-users, made an average of 2.5 visits to ambulatory care facilities during the year. It must be recalled that the denominator for this calculation is the total number of children who were ever eligible for services during the study year. When this denominator is used it appears that 42% of enrollees ever eligible fail to obtain any ambulatory services during the study year. At the other end of the scale only 4.5% or 11,409 patients made 11 or more ambulatory visits.

These calculations are somewhat distorted by the fact that length of eligibility or certification during the study year was not used as a corrective factor. For example, the average number of visits adjusted for length of eligibility might have been greater if annualized in order to take this factor into account. However, this assumes that the number of visits was directly related to length of eligibility and this seems not to have been the case in this population. Average number of ambulatory care visits was also calculated for users only. In Western Maryland there were 3.3 visits per user, Montgomery County 4.6, Southern Maryland 3.9, Central Maryland 3.2, the Eastern Shore 4.2, Baltimore City 4.3 and Maryland as a whole 4.3 visits per Medicaid user. Somewhat similar numbers of physician visits, 4.1 visits per person under 17 years per year, for the population as a whole were reported for the National Health Survey reported for 1978 (34). If total ambulatory visits were recorded this number would have been slightly greater. In the NMCUES Study average number of ambulatory visits for AFDC recipients was 5.0 visits annually (23a). These calculations show remarkable consistency across all HSAs for average number of ambulatory visits. These observations suggest that actual use of services was driven by a specific need rather than the mere accessibility of services.

The average number of visits for users of dental services varied somewhat across the State for children. As a percentage of total ambulatory users only about 37% received dental care. The percentage of total ambulatory users who sought dental services was also calculated by HSA. In Western Maryland 33.8% went to the dentist, in Montgomery County 48.1%, Southern Maryland 37.5%, Central Maryland 38.6%, the Eastern Shore 40.9%, Baltimore City 33.2% and for the State as a whole 36.5%. Therefore, almost two thirds of the ambulatory care user population received no dental services during the study year even with the exclusion of those under three years of age who are not included in the age group recommended for dental care. The dental experience for Medicaid children in Maryland is probably comparable to that of children in general. In the 1978 Health Interview Survey data for those under 17 years of age indicated that 80% of all those in the age group had never seen a dentist or not in the past year (34).

Calculation of the usual provider of care (UPC, Breslau and Haug (13) define this concept as "Usual Provider Continuity") as presented in Table 30 is an important part of the analysis since it is hypothesized that subsequent use of services is influenced by the principal provider (21). Only 12 months of data during the study period were examined

for these calculations so that in some instances a single visit may have occurred to determine the UPC.

Private physicians are considered the UPC for about 40% of children outside of Baltimore City. In the City 22.8% had a private physician as UPC while 27% were linked to a clinic facility as UPC. This is in sharp contrast to the other HSAs. The emergency room emerged as UPC in only 6.8% of patients and the indeterminate group represented 4.6% of patients.

Total payments by UPC as calculated in Table 31 demonstrates a striking difference in that the average payment for patients whose UPC was a private physician was \$375.00 while it was \$770.00 for those with a clinic as principal provider or UPC. The explanation for this is not clear but perhaps children with more serious illnesses were more likely to be seen in hospital clinics. The alternative hypothesis that care provided through a private physician is more economical compared to clinic care is a contention that has been difficult to study (9,21,35). It is noteworthy that in Table 31, 916 patients presumably had zero payments even though they were recorded as having visited an ambulatory facility. Very likely these represent invoices which were never paid because of initial rejection due to documentation problems and followed by a failure to resubmit them for ultimate payment. In seeking an explanation for the average payment variations under the UPC the racial composition of groups was examined. In Table 32, a much higher percentage of nonwhites are in the OPD category. For whites the percentage of users in the OPD category was 11.8% while for nonwhites it was 35.2%. However, in Table 14 where total average payments were examined by race the figure for users who were white was \$473.00 compared to \$469.00 for nonwhites. Consequently the racial composition of the UPC groups does not explain the differences in payments.

Hospital admissions by UPC were examined in Table 33. The admissions studied were only those that occurred among the ambulatory care group used for calculating the UPC categories. For the private physician UPC group the rate of admissions per thousand users was 116 per thousand. For the OPD this figure was 177 admissions per thousand users, while for the ER group it was 83.6 per thousand users. Therefore, the higher admission rate for the OPD may partially explain the higher payments. This observation may result from more serious medical problems being seen among the OPD group. This question can not be adequately answered from these data.

Payments for ambulatory services tabulated by UPC are described in Table 34. Here it is evident that payments to the OPD group are on average almost twice as high as those to private physicians. This may result from higher charges in OPDs or more costly care required by more seriously ill patients. The explanation for higher average payments in the OPD group compared to private physicians was not adequately explained in this study. It is noteworthy in examining this question that average costs where the emergency room is identified as the usual provider of care are quite similar to those for the private physician group. Therefore, this suggests that minor illness care is being provided in the emergency room in a significant number of instances.

The Comprehensive Child Care Program of the Johns Hopkins Hospital (C&Y) was organized in the mid 1960s to provide comprehensive health care services to children of low income families living in defined Census Tracts around the Hospital. Funding was obtained under provisions of Title V of the Social Security Act for a categorical Children and Youth Project (36). Active recruitment of families with children resulted in two very distinct populations. On the one hand certain families in income eligible categories were certified for the Medicaid Program and made use of the C&Y Project for the majority of their health care services for which the Medicaid Program was billed. These individuals retained their Medicaid Cards and were free to use any provider or facility in the State which accepted Medicaid patients. Indeed there was no special designation on their Medicaid Cards indicating that they were C&Y patients. The other group of families identified were those who were classified as medically indigent but with incomes just above the level providing for Medicaid eligibility. Services for these children were funded by the Title V Grant which was individually identified early on but then became part of the Title V Block Grant allocation to the State.

This configuration of Medicaid Eligibility in a sense allowed for a natural experiment testing the service utilization and payments for a population of children who might obtain all of their Medicaid funded care within the C&Y Project or might make use of multiple providers since no restrictions existed as to where Medicaid funded services might be obtained. No primary care "gatekeeper" existed in this setting.

At the beginning of the study year the C&Y Project had been in existence for about four years. In Table 35 the duration of eligibility during the study year is tabulated

for all Medicaid C&Y patients, Baltimore City users and all Medicaid users in the State for the childhood population. Medicaid users in the C&Y Project had the longest duration of eligibility at 76% for 12 months when compared with the other two populations. This difference may reflect greater need, a more vigorous effort to sign up and recertify families or a greater commitment on the part families to the C&Y Project.

The C&Y population was further divided as illustrated in Table 36, into those who obtained all of their Medicaid funded care at the Johns Hopkins Hospital amounting to 5900 patients. In the second column data are presented for those who made use of other resources for medical services sometime during the study year. This group numbered 1,938 and 37% of their services were obtained outside of the JHH facility.

In Table 37 these two populations are further contrasted. Single site users were found to have an average of 4.4 ambulatory care visits during the course of the 12 month period. For the multiple site users the average number of ambulatory visits was 7.8. Emergency room visits were similarly at variance with an average number of 0.5 visits for a single site user and one visit for the multiple site user. These data seem to suggest that the continuity of provider is a far more economical way of providing services than where multiple providers may be used. No incentives other than fee collections existed for either set of providers and no penalties or dysincentives functioned to restrain patient or parent health care seeking behaviors. Nevertheless, a significant proportion of Medicaid certified patients were motivated to be single site users. Others have suggested that financial incentives or risks must be imposed such as various forms of the "gatekeeper" concept to encourage continuity of provider (21,26,35). A question deserving further exploration is whether the multiple site C&Y users had more serious medical conditions and sought care elsewhere because of the demands of their condition or because of dissatisfaction with the C&Y care provided.

The question of severity of the medical condition and use of services is further explored in Table 38. The average admission rate for single site C&Y users was 87 per thousand while the admission rate was 245 per thousand for multiple site C&Y users. For all Baltimore City users the admission rate was between these two extremes at 122 per thousand users. Again it is not possible to easily differentiate severity of illness between the two C&Y populations. The number of inpatient days per thousand C&Y users might be a useful proxy measure of severity to be used

for comparative purposes. In Table 39 these data are displayed with multiple site C&Y users having rates of inpatient days for admission four times that of the single site users. Comparing multiple site users with all Medicaid users in Baltimore City the rate of inpatient days was three times that of the Baltimore City group. Medicaid payments for single site users averaged about \$445.00 while the average for multiple site users was \$1,187.00 as displayed in Table 40, reflecting the previous utilization data. The percentage of total payments allocated to inpatient care is described in Table 41 where 51% was the distribution for single site users while for multiple site users the percentage allocation was 74%. This again reflects a much greater utilization of inpatient care for the multiple site users compared to the others.

No satisfactory explanation for this difference in utilization and payments between single site users and multiple site users was determined. It is tempting to suggest that more consistent and greater continuity of care in the single site users resulted in their more favorable utilization and payment experience. Multiple site users may have had greater utilization rates and higher payments because of the lack of continuity of care. Or perhaps hospitalization brought these individuals to the attention of hospital financial staffs who made a concerted effort to certify them for Medicaid payments. Consequently, this later group may have had a rather biased experience in terms of severity of illness. Nevertheless this would not explain the greater use of outside medical care resources as demonstrated in these data.

If all multiple site users had theoretically made use of the single site providers there may have been significant cost savings as calculated in Table 42. If average payments for the 7,838 C&Y patients were made at the same level as for single site users a cost saving of almost one and a half million dollars would have been realized. This conclusion is quite speculative since the nature of the two populations have not been adequately explored and considerable bias may have existed in selection of the multiuser C&Y population. These hypothetical calculations appear in Table 42.

On July 1st of 1980 payments for visits to private physician's offices were significantly increased. This action was specifically taken in order to encourage more private practitioners to accept Medicaid patients into their practices (26,37,38,39). In the course of 18 months of observations this strategy was found to be highly successful in that private physicians significantly increased their share of children visiting private Medicaid providers.

In order to examine the impact of the fee change, utilization data and payments were compared for the six month period from January 1st, 1980 through June 30, 1980 with similar data for the six month period from January 1st, 1981 through June 30, 1981. The six months hiatus between the "before" and "after" study periods was planned to allow both providers and patients to adapt to the new reality of the private physician fee payments. In a series of data tabulations from Table 43 to Table 48 the impact of the higher office fee payment is described. As demonstrated in Table 43, while the total number of users of Medicaid services increased during this period by about 11% the number of office visits increased by 23% when comparing the "before" and "after" periods. Holahan, et al. (38) have noted similar trends where physician fees were increased. Users of ambulatory care increased by 9% while increases for clinic care were less than 1%. Visits to see a pediatrician during the same time period also increased while the average number of visits experienced a slight change from an average of 2.4 visits to 2.6 visits. A percentage increase averaging about 33.4% between the two time periods was also demonstrated in fee payments for office visits. Total Medicaid payments between the two time periods increased by an average of 7.9% while users increased by 11% indicating that the increase in office fee payments did not cause a disproportionate increase in Medicaid expenditures. In Table 46 it must be pointed out that calculations of mean payments per user are for a six month period rather than for the twelve month period used in other sections of this study. Increases in office utilization occurred despite the fact that the discrepancy between office visit charges and actual Medicaid payments hovered at about 73%. This was true for the State as a whole as well as for Baltimore City. These data presented in Tables 47 and 48 suggest that despite this discrepancy private office providers made a concerted effort to provide more care for Medicaid children in their practices.

Dental services were used by only 21% of enrolled children during the twelve month study period. In the earlier Table 29 descriptive data for dental care users only were presented. The highest percentage of users was in Western Maryland, while Eastern Shore enrollees came next in the frequency of use. Baltimore City and Southern Maryland demonstrated the lowest use of dental services. The pattern of utilization was examined against the data on availability of dentists in the several HSAs. There was no apparent correlation between these factors. Therefore, the low utilization of dental services cannot be explained on the basis of inadequate number of dental practitioners. Prophylactic dental services were even less frequently used

with an average percentage of enrollees at 16.6%. Race did not differentiate users and nonusers and percentages were about the same for both groups. Perhaps the natural aversion to dental manipulations by many people better explains the poor showing in this area.

The EPSDT Program has been mentioned previously in light of the poor participation in most States. However, one impact of early identification and early treatment of abnormalities is presumably lower cost. This hypothesis was tested in Table 51 where average Medicaid payments by age group is compared for all Medicaid users against those who had at least one EPSDT office visit. Average total payments for EPSDT users was \$325.00 compared with \$470.00 for all Medicaid users. These represent very substantial differences and suggest that the EPSDT Program was indeed effective in accomplishing its goals. The differences persist as shown in Table 52 when similar total payments for users in Baltimore City are tabulated.

Early identification of chronic problems is believed to be a cost effective strategy (33,12). However, it may also be that the EPSDT population is a very biased group in that these parents may be especially sensitive to the value of preventive services and not only make use of preventive care but are more health conscious at home.

Preventive care services are not only provided under the EPSDT billing code but similar services may be billed under the Office Supervision billing code. Whether or not the component health supervision services are similar for the two types of visits is unknown. However, average total Medicaid payments for those who had at least one Office Health Supervision visit was the same or higher than mean payments for all users. In Table 53 the mean payment for all users was \$470.00 while for those with at least one health supervision visit it was \$510.00. This suggests that EPSDT screening visits and health supervision visits may be somewhat different in content since the outcome in terms of total payments seems to be quite different for the two groups. It is interesting to note that many fewer EPSDT screens were done; 14,000 compared to office health supervision visits which numbered 36,409. Nevertheless, perhaps this number should be added to the number of EPSDT screens in order to better represent the magnitude of Medicaid preventive care in the State. EPSDT screening services have encountered many obstacles in their implementation (32,12,40). Nevertheless, benefits for recipients of such services have been demonstrated (41) as was shown here.

Continuity of care where one physician or a small group of professionals provides regular care for a child is often cited as a highly desirable arrangement. Presumably, care is more consistent, compliance with recommended medical interventions occurs more frequently and patient-provider relations are far more supportive (21). It was previously noted that where a private physician served as the usual provider of care (UPC) total Medicaid payments might be less than where these conditions did not exist (26). In the analyses described in Tables 54 through 58 a similar question is asked regarding the impact of consistent ongoing certification for the Medicaid Program. Note that the parameters studied had to do with duration of certification and eligibility and did not consider the UPC. In these tabulations "extended" eligibility was studied for its impact on total payments and inpatient utilization. The assumption is made that increasing payments and hospitalization are undesirable outcomes.

As can be observed in Table 54 average payments when tabulated against months of certification in the program during the study year reveal a nonlinear relationship. Average payments were lowest for those enrolled for the full twelve months of the study year and gradually increased from one to three months to a high point at seven to eleven months. This suggests that perhaps new users including newborns and infants accounted for disproportionately high expenditures. As previously noted because of often serious perinatal pathology average payments for those under a year of age are considerably higher than for older children. In the second line of Table 54 average payments for all new users enrolled during study year are tabulated. As is readily apparent new users are far more costly than the total population. Average payments for new users is \$723.00 compared to \$470.00 for all users. Indeed new users enrolled for the entire twelve months of the study year reveal average payments of \$977.00, far more than for any other registered group. These data seem to suggest that many patients enter the Medicaid system because of serious medical problems often entailing very significant payments. Consequently, in one sense the Medicaid Program serves as a rescue operation for those with serious and costly medical needs.

Further analyses of these data also permitted an answer to the question as to whether or not extended eligibility, which offered an opportunity for continuing care, provided concrete benefits for children. On and off periods of eligibility might interfere with continuity of care and thereby result in more costly medical care. This problem

might occur when more serious consequences of illness or abnormality resulted due to prolonged neglect.

To examine this question the concept of extended care was developed in order to identify populations of children who had been eligible for Medicaid services over an extended period. The last line of Table 54 records the average payments for a group of children who were eligible for services for a full twelve months before the start of the study year. In order to control for eligibility requirements the children in this population must be two years of age or older. For this extended care group average payments were \$357.00 while for new users two years of age or older average payments were \$526.00, 47% more than for the old users with an extended period of eligibility.

These tabulations were further refined in Table 55 in which an extended care population is defined as those who had 12 full months of coverage prior to the study year in addition to 12 months of full eligibility during the study year. Again those with an extended period of eligibility for Medicaid Health Services demonstrated total payments of \$369.00 compared with \$470.00 for all users in the same age groups. Therefore in looking at average Medicaid payments an extended period of eligibility results in lower expenditures than for recently enrolled patients.

Admission rates for these populations were examined in Table 56. As might be expected from the findings the admission rate per thousand was 90.2 for the extended care group compared to 117.7 for the similar age grouping of new users. Inpatient days per thousand users are examined by age group in Table 57 where the same trends are observed. Inpatient days for the extended care group were considerably less by 24%. Further tabulation of emergency room utilization by the various eligibility groups showed less variability than for inpatient care. The extended care of two year olds revealed 502.5 ER visits per thousand users compared to 519 for the two years of age and older group compared with a 560.2 ER visits for the total number of users enrolled for a full twelve months of eligibility during the study year.

Consequently, an extended period of Medicaid eligibility leads to lower total payments because of less need for inpatient care. Therefore, if illnesses can be identified at an earlier stage, preventive care may be effective in decreasing the need for hospitalizations. It should be noted that these populations merely reflect those with accessibility to care since the usual provider of care may have varied between several providers.

Assessment of Care for Selected Medical Conditions:

Following the lead of Kessner (42) a limited number of "tracer" conditions or circumstances were identified for study. The assumption was made that certain processes associated with each condition should be identifiable or limited outcomes should occur. Obviously, all measures to be used in this assessment process must be present in the MMIS payments file. Despite this limitation several very useful parameters were identified in payment records including age, medications, ER visits, inpatient admissions, specialty visits among others. Singly or in combination certain of these factors should be found associated with specific diagnoses. There was no intent to apply these criteria to providers and data were examined in the aggregate to test the feasibility of the measures. Office records were not reviewed to verify computerized files and it must be remembered that certification was not continuous for some patients during the 12 month study period. Others have proposed "quality of care" measures or audits using MMIS files but output from these efforts has been limited (43, 44, 3, 4).

Asthma causes considerable morbidity in low income populations and was a common problem among Medicaid eligible children (17). For purposes of identifying children with asthma in the payment files it was not possible to use a single diagnostic code. Asthma was included among a general category of respiratory conditions and the diagnosis was made for study purposes by combining this general diagnostic code with the finding of bronchodilator medication for that particular patient also. Asthma was more commonly diagnosed in males and also in the one to five year old age group. In addition it was not uniformly identified across the several HSAs.

The rate for the total population of users was 21.5 per thousand with Western Maryland at 16.0, Montgomery County 23.8, Southern Maryland 21.0, Central Maryland 19.8, Eastern Shore 32.3 and Baltimore City 21.0 per thousand users. It is unknown why these differences in prevalence occurred and may represent differences in environmental conditions or may be due to some artifact of data entry. Mean payments for those with asthma are compared in Table 61 to those without asthma. Payments for asthmatics averaged \$921.00 compared to \$461.00 for others. Ambulatory visits numbered almost 10 for asthmatics compared to only 2 for others. It is apparent that this is a rather costly illness both in terms of the financial drain on the system and because of patient absentee problems. In Appendix D it is demonstrated in comparing a Medicaid population with a middle class HMO population that within groups of similar severity hospitalization rates are much higher in the low income group. The explanation for the striking difference is

unknown and deserves further study. This might reveal techniques which could significantly reduce the morbidity for low income children who are far more likely to suffer educational setbacks due to school absenteeism than are comparable middle class populations.

Professional recommendations (18) suggest that tetracycline should not be given to children under 9 years of age. Tetracycline may discolor and damage developing teeth. It was possible to study this issue as shown in Table 62 where less than 1% of those under 3 years of age had received tetracycline.

Another quality of care issue was examined by tabulating use of antibiotics for those children with Upper Respiratory Infections in the various HSAs. Of those coded as having Upper Respiratory Infections, 50% received antibiotics which seemed to be inappropriately high. However, further study is necessary to determine the reason for antibiotic use. If used for complications this would have been appropriate utilization. However, the prevalence of complications with URIs is far lower than 50% (19a).

Similarly it was possible to identify individuals with Rheumatic Heart Disease and determine how many were receiving penicillin. It was not possible to differentiate acute use from prophylactic use. Of those identified as having Rheumatic Heart Disease 25% were receiving penicillin. Whether or not this represented an adequate followup would also require further study of medical records.

Birth injuries and dysmaturity are tabulated in Table 65. The very high percentage occurrence of these problems is well above what would normally be expected. Either this is a reflection of inadequate prenatal care or it suggests that infants with special problems are more likely to be enrolled in the Medicaid program probably because of high hospital costs and the lack of other forms of insurance.

Otitis Media is a very common complication of the common cold (19a). In Table 66, 19,891 children with Otitis Media were identified. Only about 1% of those with the problem were recorded as having audiometric testing even though the occurrence of persistent middle ear effusions and hearing impairment are many times this percentage (45). Whether or not this observation represents a failure in adequate followup of children who may have middle ear effusion is unknown from examination of these data and further study is required to determine this.

CONCLUSIONS

Despite the limited number of data elements in MMIS records in Eligibility and Payments files very useful information may be derived from these data beyond eligibility and payments functions. Information of value for planning purposes, monitoring services for availability by area of the State, even certain patient care observations may be provided all of which can assure more efficient and effective Medicaid Services for children.

To allow greater accessibility to these files the procedures followed in this study may suggest a more flexible approach. The many data-base-management systems (DBMS) currently available provide increasingly more powerful, faster and more flexible data analysis capabilities. The INFORM System used here was one of many. Consequently, periodic or special purpose conversion of MMIS data to DBMS compatible files may be the most productive approach to assure ready access to MMIS files if direct access with the required speed and flexibility is not currently available.

As demonstrated by others also continuity of care provided by private physicians in their office practices or in a Title V C&Y Project appear to assure comprehensive care at reasonable cost for certain children enrolled in Medicaid. Increasing office fees encouraged greater physician participation to aid in achieving these goals. And a very significant number of children were found to have been enrolled for an extended period who might form the core population to benefit from a continuity program.

However, as suggested in the comparative asthma studies of Medicaid enrollees and middle class health plan patients inpatient care is for more frequently needed for Medicaid asthmatics and other patients. Why this was necessary is not entirely clear but ambulatory care at home was not adequate to control the Medicaid child's disease. Perhaps as suggested by the Select Panel for the Promotion of Child Health in their 1981 report (46) multiproblem families require health services beyond the capabilities of "individual provider arrangements." They focus on Home Visiting by Public Health Nurses or lay workers as an important modality for extending the effectiveness of conventional health care services. MMIS patient data might be used to identify high users with special problems who might benefit from home visiting services or others for example. Recognition of this added dimension of care beyond the individual practitioner might be served by closer linkages between providers, home visiting agencies such as health departments and the Medicaid Agency.

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APPENDIX A

Content of MMIS Eligibility Record
and Recalculated Eligibility
Summary Variables

Medicaid Eligibility Record

Master System

Fields taken from the Individual Record

<u>Position #</u>	<u>Variable</u>	<u>Field Head</u>	<u>Case or Explanation</u>
2-3	County	COUNTY	01-Allegany 02-Anne Arundel 03-Baltimore 04-Calvert 05-Caroline 06-Carroll 07-Cecil 08-Charles 09-Dorchester 10-Frederick 11-Garrett 12-Harford 13-Howard 14-Kent 15-Montgomery 16-Prince George's 17-Queen Anne's 18-St. Mary's 19-Somerset 20-Talbot 21-Washington 22-Wicomico 23-Worcester 30-Baltimore City
4-9	Case Number	CASE-NUMBER	
11-12	Birth Year	BYEAR	
13	Tie Breaker	TIE	0 unless greater than 1 child born in same year
37-39	State Institution HOSPITAL or hospital number		<u>Chronic Hospitals</u> 107-Deer's Head Center 108-Montebello Center 109-Western Maryland Center 110-SNCF Western Maryland 113-Thomas Wilson, ICIA 114-Pine Bluff <u>Mental Hospitals</u> 220-SW Baltimore Co. Community Mental 221-Md. Psychiatric Research Center

223-Regional
Institution for
Children &
Adolescents

Mental Hospitals-Cont'd

224-Highland Health
Center Inpatient
Psychiatric Unit
225-Crownsville
Hospital Center
226-Eastern Shore
Hospital Center
227-Springfield
Hospital Center
228-Spring Grove
Hospital Center
229-C.T. Perkins
Hospital Center
230-Walter P. Carter
Center
231-Finan Center

Hospitals for the
Retarded

331-Rosewood Center
Annex
333-Rosewood Hospital
Center
334-Henryton Hospital
Center
335-Great Oaks Center
336-Ritchie Building
Annex
337-Highland Health
Facility
338-Holly Center
339-Victor Cullen
Center
340-Finan Center
341-Western Maryland
342-Walter P. Carter
Center

Other

440-Tawes Building ICFA
441-Thomas Wilson ICA
442-Western Maryland
Skilled Nursing
443-Spring Grove Bland
Bryant Building
444-Deer's Head Center

Insurance Code INSURANCE

			A-Blue Cross/Blue Shield of Maryland B-Medicare Supplement F - G r o u p Hospitalization, Inc. K-Aetna Life & Casualty L-Connecticut General M-Equitable Life N-Lincoln National P-Metropolitan Q-Prudential R-Travelers S-Supplement to Medicare W-CHAMPUS/Va. X-Single carrier with no assigned code Y-Union or other "association" type insurance Z-More than one health carrier 0-Potential Insurance 9-No Insurance
44-47	Date of Birth	DOB	Year, Month
48	Race	RACE	1-White 2-Negro 3-American Indian 4-Race Unknown 5-Old Cuban Refugee 6-Indo-Chinese Refugee 7-New Cuban Refugee 8-Cuban/Haitian Refugee 9-All Other Refugees
49	Sex	SEX	1-Male 2-Female
83	Reason for Cancellation	CAN REASON	D-Died E-Employed C-Other
87-89	Three Month ID Date	DOEND	Last expiration date of Medical Assistance Card
91	Prepay Code	PREPAY CODE	B-East Baltimore Medical Plan D-West Baltimore Medical Plan F-Chesapeake I-Constant Care

				K-Metropolitan Baltimore HMO
				Y
				Z
95-96	Category	CTEGRY		01-Old Aged Assistance (0AA)
		SSI		03-Public Assistance to the Needy Blind (PANB)
				06-Aid to the Permanently and Totally Disabled (AFDC)
		CIND	CA	08-Essential Person (EP)
				02-Aid to Families with Dependent Children (AFDC)
			PA	.FC-Foster Care .UP-Unemployed Parent .State Supplement .UF-Unemployed Father
				04-General Public Assistance (CPA) .E-Employable
				09-Medical Assistance Aged (MAA)
				19-Medical Assistance Blind (MAA)
				29-Medical Assistance Disabled (MAD)
				30-Medical Assistance Foster Care (MAFC) (Dept. of Juvenile Services)
				39-Medical Assistance for Children in Families (MAC)
		MIND	MA	40-Medical Assistance, State Only Funds (N- FED)
				45-Medical Assistance, Subsidized Adoption (MMI)
				49-Medical Assistance for Responsible Relative (MAR)

97	Instituion	INSTITUTION	0-Obsolete Code 1-Individual who is recertified on a N- type card (no resources available for spend-down) 8-Individual who is recertified on a P- available for spend-down) 2-Individual in State- run Institution +-Eligibility cancelled during period specified in bucket (+sign can be over any code)
	type card (resources		
98-101	Begin Date	DOSTART	B e g i n n i n g o f eligibility period
102-105	End Date	DOFINISH	End date of eligibility period
106-107	Category		
108	Institution		
109-112	Begin Date		
113-116	End Date		
117-118	Category		
119	Insitution		
120-123	Begin Date		
124-127	End Date		
128-129	Category		
130	Instituion		
131-134	Begin Date		
135-138	End Date		

Fields Added to the Master System

<u>Field Head</u>	<u>Code or Explanation</u>
<u>ELIGIBILITIES</u>	Total number of periods of eligibility buckets
<u>TELIGIBILITIES</u>	Number of periods of eligibility prior to July 1, 1980
<u>TTIME</u>	Total number of months from start of first eligibility period to June 30, 1980
<u>TMONTHS</u>	Number of months eligible from start of first eligibility period to June 30, 1980
<u>NMONTHS</u>	Number of months eligible during January-June, 1980
<u>SMONTHS</u>	Number of months eligible during July, 1980-June, 1981
<u>GMONTHS</u>	Greatest consecutive number of months eligible in one bucket during July, 1980-June, 1981
<u>HMONTHS</u>	Greatest contiguous number of months eligible during July, 1980-June, 1981
<u>SPERIODS</u>	Number of periods of eligibility during July, 1980-June, 1981
<u>HPERIODS</u>	Number of contiguous periods of eligibility during July, 1980-June, 1981
<u>IMONTHS</u>	Number of months in a state-run institution during January-June, 1980
<u>IYEAR</u>	Number of months in a state-run insitution during July, 1980-June, 1981
<u>CINDIVIDUAL</u>	Number of months Categorically Indigent (Medical Assistance Category Codes 2-8) during July, 1980-June, 1981
<u>MINDIVIDUAL</u>	Number of months Medically Indigent (Medical Assistance Category Codes 9-49) during July, 1980-June, 1981

Fields Added to the Eligibilities Form

Field Head

Code or Explanation

LMONTHS

Length in months of individual bucket

Field taken from the Grant Record, Added to Master System

Field Head

ZIP CODE

APPENDIX B

The INFORM Data-Base Management Programs,
Examples of Summary Files and Explanations of
Their Contents.

The INFORM Date-Base Management Programs

(Version 4/17/84)

by
Eliezer Naddor, Michael J. O'Neill,
Thomas J. Pollard

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- 3.5. The Payments Super-Systems
- 3.6. The Summary Systems
- 3.7. Generation of Tables
- 3.8. Supporting Programs

3.1. Introduction to INFORM

INFORM is a general-purpose package of programs for management of data bases. It is flexible and easy to use, yet very powerful. Since the source code of all programs is available, we were able to modify programs to meet the special needs of our study.

INFORM allowed us to first study in detail a small number of the millions of records pertaining to medicaid eligibilities and payments. It also allowed us to examine records of individual children and to obtain preliminary frequency counts of numerous attributes. As a result of this preliminary work, we were able to anticipate difficulties in studying our entire population and to make the appropriate corrections and adjustments. A major portion of our time was devoted to this aspect of the work.

Numerous programs (to be discussed in section 3.8) were written for reading the original medicaid tapes, extracting information, and computing various summary results. The data generated by the programs were placed in files which were subsequently read by INFORM. INFORM checked, packed and stored the data in the files according to the methods described in section 3.3.

In section 3.2 we list the special terms used in INFORM. The unique types of fields of INFORM are presented in section 3.3.

Sections 3.4, 3.5, and 3.6, respectively, give details on how we placed the eligibility, payment, and summary data into INFORM's files. Examples of data pertaining to a specific child are also given in these sections.

In section 3.7 we describe the methods used to generate tables. Illustrations are given for medicaid payments by age, race, sex, county, HSA, and for the state of Maryland.

Section 3.8 describes some of the programs which were needed to prepare the data for INFORM, to modify the data in INFORM's files, and to summarize some of the tables generated by INFORM.

3.2. Terminology

The fundamental unit of information in INFORM is the character. All 256 characters on the PDP are used. In our discussion we will distinguish the following characters:

Alphabetic characters (52) - the upper case letters A to Z (ASCII values 65 to 90) and the lower case letters a to z (ASCII values 97 to 122)

Numeric characters (10) - the digits 0 to 9 (ASCII values 48 to 57)

Special characters (33) - the space (ASCII value 32), the characters !, ", ..., / (ASCII values 33 to 47), :, ;, ..., @ (ASCII values 58 to 64), [, \, ..., ' (ASCII values 91 to 96), and {, |, ..., ~ (ASCII values 123 to 126).

Other characters (161) - the non-printable characters (ASCII values 0 to 31 and 127 to 255)

A group of one or more consecutive characters is called a word. For example, '20003504' is a word of eight numeric characters, "+" is a word with one special character, and "80/05/12" is a word of eight numeric and special characters. A data base system is essentially used to store and retrieve words.

Words are placed in fields. In INFORM a specific field always has a fixed number of characters, and this number is referred to as the length of the field. This length is established when the data base is started.

In addition to its length, INFORM recognizes several other characteristics of a field. They include its head and its type. The head of a field is its title or name. For example, the head

of the field in which '20003504' is placed is CASE-NUMBER, and the head of the field for '+' is INSTITUTION.

The type of a field is used by INFORM to check words submitted by the user as well as to store, retrieve and display them.

In the next section of this chapter we give specific details about INFORM's types of fields.

An item of information, or item for short, is a collection of related words. Here are nine items from a specific data base related to Medicaid eligibility of children:

Figure 3.2a Nine Items from the Eligibilities System

CASE-NUM	BY	T	CT	I	DOST	DOFI	LM
20003504	67	0	39	1	7204	7601	46
20003504	67	0	2	1	7602	8201	72
20003504	70	0	2	1	8101	8201	13
20003504	73	0	2	1	8101	8201	13
20003522	63	0	39	1	7504	7509	6
20003564	64	0	40	+	7111	7203	5
20003564	64	0	2	0	7204	7409	30
20003564	64	0	2	1	7410	8002	65
20003564	64	0	40	A	8003	8007	5

Each one of these items has eight fields with the following characteristics:

Figure 3.2b The Fields of the Eligibilities System

Field No.	Length	Type	Head	Remark
1	8	NUM	CASE-NUMBER	Family medicaid number
2	2	COD	BYEAR	Birth year
3	1	COD	TIE	Tiebreaker
4	2	COD	CTEGORY	Category of eligibility
5	1	TEX	INSTITUTION	
6	4	NUM	DOSTART	Date eligibility begins
7	4	NUM	DOFINISH	Date eligibility ends
8	3	COD	LMONTHS	Eligibility months

In INFORM, a data base system is composed of two files - the anchor file and the storage file. The storage file holds the items themselves, while the anchor file contains information about the system as a whole, such as the number of items in the storage file, the number of fields in each item, and the characteristics of each field.

One of INFORM's main features is the capability to transfer designated information from one data base system to another. A collection of systems involving such transfers is called a super-system. It is composed of a master system, inverted systems, and form systems (or master, inverts, and forms for short). INFORM allows a supersystem to have one master, up to nine inverts and up to 26 forms. Transfer of information occurs from the master to the inverts, from the master to the forms, and from each form to the master. When a new super-system is started, the user must establish the characteristics of the items in the master, the number of inverts and forms, and the characteristics of the items in each of the inverts and forms.

The items in an inverted system are based entirely on the master system. Its fields are given in a different order, and not all fields may be represented. Inverts are useful in systems where the first field in the master is some identifying number, such as a social security number, and the second field has the name of a person. In the inverted file, the first field might be the name of the person while the second may be the social security number. In our study we have not used inverted systems in the present study.

Form systems are used to supplement information in the master. For example, the master may contain one item for each child, while one of its forms may contain a variable number of items for each child. Here is an example of the first 13 fields in a master for medicaid children containing general eligibility information:

Figure 3.2c The First 11 Fields of the Medicaid Master System

Field No.	Length	Type	Head	Remark
1	8	NUM	CASE-NUMBER	Family medicaid number
2	2	COD	BYEAR	Birth year
3	1	COD	TIE	Tiebreaker
4	3	ALP	HOSPITAL	Institution
5	1	TEX	INSURANCE	Supplementary insurance
6	4	NUM	DOBIRTH	Date of birth
7	1	COD	RACE	Race
8	1	COD	SEX	Sex
9	1	TEX	CAN REASON	Cancellation reason
10	4	NUM	DOEND	Date eligibility ended
11	1	TEX	PREPAY CODE	HMO membership
12	5	NUM	ZIP-CODE	Zip-code
13	2	NUM	ELIGIBILITIES	Number of eligibilities

Each child has a single item in this master system. For example, a child with a family medicaid number of 20003504, a birth year of 67, and a tie breaker of 0, has one item in the master system. This child happens to have two eligibilities, a number recorded in field 13. There are, therefore, two items for this child in a form system. These are the first two items illustrated earlier in Figure 3.2a.

Other forms in the Medicaid children's super-system include visits to and payments for clinics, pediatricians, emergency rooms, hospital admissions, and pharmacy. When such forms are used, the master may be extended to include fields for summary information transferred from the forms.

3.3. Types of Fields in INFORM

When a new system is designed for use with INFORM, each field is assigned a specific type. This type indicates what characters INFORM should expect when accepting words, how it stores them in the storage file, how it retrieves them, and how it displays them to the user. The main reasons for assigning types to fields is for checking data entries and for conserving space. INFORM has 10 standard types of fields, 10 dictionary fields, and 6 arithmetic fields.

Figure 3.3a summarizes INFORM's six common field types. For each type we have shown the three-character head used by INFORM. Also given is a brief description of the field and two examples of its possible content. For a complete definition of a field, INFORM needs its head, type, length, and a requirement code. The latter is not discussed since its primary use occurs during data input.

Figure 3.3a Six Types of Fields in INFORM

No.	Type	Description	Example 1	Example 2
1	DAT	Date	80/06/18	81/20/05
2	TEX	Text	+	A
3	ALP	Alphanumeric	J.H.H.	-32,768
4	COD	Code	0	255
5	NUM	Number	6706	20003045
6	TOT	Total	15.99	1234.

(
Date (DAT) - INFORM accepts and displays dates in the form YY/MM/DD, where YY are numbers from 01 to 99, MM are numbers from 01 to 12, and DD are numbers from 01 to 31. It also accepts and displays the date 00/00/00. In anticipating the next century, INFORM also accepts and displays the dates from A0/01/01 (for January 1, 2000) to I0/06/04 (for June 4, 2080). The total number of days for these dates is 65536, which equals 256 squared. It is therefore possible to store each date by using only two characters.

Text (TEX) - Fields of this type accept any of the 95 printable characters. They are stored and retrieved without modification.

Alphanumeric (ALP) - INFORM considers 40 alphanumeric characters comprised of the 26 upper case alphabetic characters, the 10 numeric characters, and the four special characters: space (), dash (-), comma (,), and period (.). Note that 40 cubed is 64000. Hence every three alphanumeric characters can be stored as two ASCII characters.

Code (COD) - Fields of this type contain numbers from 0 to 255. Each such number can be stored as a single ASCII character.

Number (NUM) - This field contains any number of numeric characters, optionally preceded by the minus (-) character. Every two characters of the field (including the minus sign, if any) are converted to a single ASCII character and then stored. In this way a four-digit word is stored as two characters and a seven-digit word as four characters.

Total (TOT) - This type is used for fields containing numbers with decimal points, and is related to the command TOTAL, which tells INFORM to compute totals of all the numbers in such fields. Each two numerals in the field are stored in a single character. The decimal point is not stored, of course. INFORM knows where to place the decimal point by inspecting the length of the field. If the length of a field is, say, 7.2, then INFORM accepts and displays numbers in the format ####.##.

3.4. The Eligibility Super-Systems

As discussed in Chapter 2, the eligibility tapes maintained by the Maryland Medical Assistance Program contain three types of records: grant records, individual records, and supplementary records. Grant records have information pertaining to families, while individual records contain information about each family member. Each individual record has a fixed number of fields, followed by one or more forms containing information related to the eligibilities of the individual - the so called 'buckets'. An individual record can have up to four buckets. If additional buckets are needed, they are placed in supplementary records.

In INFORM's systems we placed the fixed fields of the individual record into a master, and all the buckets into a form. In addition, we placed the ZIP code from the grant record, the number of buckets, and numerous summary fields in the master. We shall refer to the master as the Medicaid children system, to the form as the eligibilities system, and to both as the eligibility super-system.

Since the maximum number of items that INFORM can handle in a given system is 65536, we decided that the children in each county would have their unique super-system. Since in Prince George's county and Baltimore City there would have been more than 65536 items in one system, multiple super-systems were created.

A summary of the eligibility super-systems is given in Figure 3.4a. From the figure we note our naming conventions for the systems. The master of the first county (Allegany) is called 01L0 and its form is called 01LA. The corresponding names for Prince George's (the 16th county) are 16L0, 16LA, 16L0, and 162LA. Similarly, the Baltimore City systems are 30L0, 30LA, ..., 306LA. We thus have 30 super-systems (24 for the 23 counties in Maryland, and six for Baltimore City). Our master systems contain 285,401 children. The form systems have 717,572 items, indicating about 2.5 eligibilities per child.

(The eligibility super system for each county was subsequently expanded to include summary information. The details are given in section 3.6. For example, in Allegany county, in addition to form 01LA, we now also have forms 01LB, 01LC, 01LD, 01LE, 01LF, 01LG, 01LH, and 01LI. Special additional forms were prepared for Baltimore city, so that we also have the forms 301LJ, 301LK, 302LJ, ..., 306LK.)

Figure 3.4a The Eligibility Super-Systems xxL0 and xxLA

Master	Form	County	HSA	Master	Form
01L0	01LA	Allegany	WM	4,718	14,675
02L0	02LA	Ann Arundel	CM	17,293	44,040
03L0	03LA	Baltimore County	CM	18,861	43,645
04L0	04LA	Calvert	SM	2,904	9,850
05L0	05LA	Caroline	ES	1,895	5,500
06L0	06LA	Carroll	CM	2,983	8,061
07L0	07LA	Cecil	ES	4,345	16,323
08L0	08LA	Charles	SM	5,042	15,985
09L0	09LA	Dorchester	ES	2,706	9,056
10L0	10LA	Frederick	WM	3,698	10,879
11L0	11LA	Garrett	WM	2,085	8,275
12L0	12LA	Hartford	CM	7,406	21,539
13L0	13LA	Howard	CM	2,274	5,168
14L0	14LA	Kent	ES	1,054	3,143
15L0	15LA	Montgomery	MC	14,214	40,042
16L0	16LA	Prince George's	SM	11,242	35,008
162L0	162LA	Prince George's	SM	21,838	40,213
17L0	17LA	Queen Anne's	ES	1,535	4,388
18L0	18LA	St. Mary's	SM	3,446	10,532
19L0	19LA	Somerset	ES	1,930	6,715
20L0	20LA	Talbot	ES	1,214	3,356
21L0	21LA	Washington	WM	4,678	16,150
22L0	22LA	Wicomico	ES	4,990	15,959
23L0	23LA	Worcester	ES	1,941	4,910
301L0	301LA	Baltimore City	Bal	23,579	59,785
302L0	302LA	Baltimore City	Bal	23,663	65,404
303L0	303LA	Baltimore City	Bal	21,006	55,284
304L0	304LA	Baltimore City	Bal	27,382	58,774
305L0	305LA	Baltimore City	Bal	19,454	38,000
306L0	306LA	Baltimore City	Bal	26,025	46,710
Maryland				285,401	
717,572					

As shown in Figure 3.4b, each item in the master has 27 fields. The head MAX stands for the maximum number of characters in the field. For fields of type COD, MAX gives the range of possible values: 60.081 means that the range is from 60 to 81, and 1.255 stands for a range from 1 to 255. PR is the order for printing the item, LEN is the internal storage length, and CUM is the cumulative length.

(Note that the internal total length of the master item is 37 characters. Actually, 38 characters are used. The last character has various applications (including marking of cancelled items). Since the external length of the item is 60 ($8+2+1+3+\dots+2$), about 40% in storage space is saved by INFORM's packing method.

The first 11 fields of the master were directly copied from the original individual record of each child. The ZIP-CODE was obtained from the family grant record. Field 13 is the number of buckets in the eligibilities form, and fields 14 to 27 were computed using the methods described in section 2.x.

Figure 3.4b The Fields in the Medicaid Children Master System

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
4 HOSPITAL	ALP	3	Required	4	2	8
5 INSURANCE	TEX	1	Required	5	1	9
6 DOBIRTH	NUM	4	Required	6	2	11
7 RACE	COD	1.009	Required	7	1	12
8 SEX	COD	1.003	Required	8	1	13
9 CAN REASON	TEX	1	Optional	9	1	14
10 DOEND	NUM	4	Required	10	2	16
11 PREPAY CODE	TEX	1	Optional	11	1	17
12 ZIP-CODE	NUM	5	Optional	12	4	21
13 ELIGIBILITIES	NUM	2	Form	13	2	23
14 TTIME	COD	1.255	Required	14	1	24
15 TMONTHS	COD	1.255	Required	15	1	25
16 TELIGIBS	COD	1.099	Required	16	1	26
17 NMONTHS	COD	1.006	Required	17	1	27
18 SMONTHS	COD	1.012	Required	18	1	28
19 GMONTHS	COD	1.012	Required	19	1	29
20 HMONTHS	COD	1.012	Required	20	1	30
21 SPERIODS	COD	1.012	Required	21	1	31
22 HPERIODS	COD	1.012	Required	22	1	32
23 IMONTHS	COD	1.006	Required	23	1	33
24 IYEAR	COD	1.012	Required	24	1	34
25 CINDIVIDUAL	COD	1.012	Required	25	1	35
26 MINDIVIDUAL	COD	1.012	Required	26	1	36
27 AMONTHS	COD	0.006	Required	27	1	37

The eligibilities form is given in Figure 3.4c. The information for the fields was obtained from the buckets in the eligibility tapes.

Figure 3.4c The Fields in The Form Eligibility System

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-5 TIE	COD	0.005	Required	5	1	6
4 CTEGRY	COD	0.099	Required	4	1	7
5 INSTITUTION	TEX	1	Required	5	1	8
6 DOSTART	NUM	4	Required	6	2	10
7 DOFINISH	NUM	4	Required	7	2	12
8 LMONTHS	COD	1.255	Required	8	1	13

An example of an item in the master and the corresponding two items in a form are given in Figures 3.4d and 3.4e, respectively. The data present Medicaid enrollment information for a child living in County 20, which is Talbot County. This black female, born in June, 1967, had been enrolled in Medicaid for a total of 99 months before the start of our main study period, which began in July, 1980. She had been enrolled continuously during our study period, by virtue of being categorically indigent. Historically, she had had two eligibility periods, one beginning in April, 1972 and ending in January, 1976 and the other beginning in February, 1976 and continuing through January, 1982. Although there was no lapse in eligibility, this child had two "buckets" since her Medicaid status changed from Medically Indigent to Categorical Indigent in February, 1976.

Figure 3.4d An Item in the Children Master System 20L0

CASE-NUMBER	: 20003504
BYEAR	: 67
TIE	: 0
HOSPITAL	:
INSURANCE	:
DOBIRTH	: 6706
RACE	: 2
SEX	: 2
CAN REASON	:
DOEND	: 8201
PREPAY CODE	:
ZIP-CODE	: 21601
ELIGIBILITIES	: 02
TTIME	: 99
TMONTHS	: 99
TELIBS	: 2
NMONTHS	: 6
SMONTHS	: 12
GMONTHS	: 12
HMONTHS	: 12
SPERIODS	: 1
HPERIODS	: 1
IMONTHS	: 0
IYEAR	: 0
CINDIVIDUAL	: 12
MINDIVIDUAL	: 0
AMONTHS	: 6

Figure 3.4e Two Items in the Eligibilities Form System 20LA

CASE-NUMBER	: 20003504
BYEAR	: 67
TIE	: 0
CTEGRY	: 39
INSTITUTION	: 1
DOSTART	: 7204
DOFINISH	: 7601
LMONTHS	: 46

CASE-NUMBER	: 20003504
BYEAR	: 67
TIE	: 0
CTEGRY	: 2
INSTITUTION	: 1
DOSTART	: 7602
DOFINISH	: 8201
LMONTHS	: 72

3.5. The Payment Super-Systems

Each record in the Medicaid payments tapes is composed of a fixed base followed by a variable number of increments. There are two types of increments - service payments and pharmacy payments. A given base is followed by either service increments or pharmacy increments, but not by both. In INFORM, we placed the base data in the master of a payments super-system, the service data in one form, and the pharmacy data in another form.

As discussed in Chapter 2, payment data for each child were collected from three different sets of tapes. To identify the source of each item, we added the four-digit field, FORM COUNT, to the master and each of the forms. The first digit identifies the set of tapes from which the item was obtained. The next three digits correspond to the number of the base record within a group of records of a child. For example, a FORM COUNT of 2052 indicates that the corresponding item came from the second group of tapes and that it is the 52nd base record in that group.

Figure 3.5a shows all the fields in the master of the payment super-system. The first three fields are identical with the corresponding fields in the eligibility super-system. The fourth is the FORM COUNT. The remaining fields were copied from the original base record. The last field, INCREMENTS, contains the number of items in the corresponding form.

The service form is given in Figure 3.5b and the pharmacy

form in Figure 3.5c. All the data were copied from the original increments, except fields 7 to 10 in the pharmacy item. These were obtained from the National Drug Directory tapes (see section 3.8).

An illustration of a base item and its corresponding two service items is given in Figure 3.5d for the same child described in section 3.4. On April 4, 1981 the child visited the emergency room of Hospital 00030. The diagnosis coded was 46 (pneumonia/bronchitis). Two services were provided at the visit, radiology services, for which the hospital charged \$35 and was paid \$33, and the emergency room visit itself, for which the hospital charged \$39 and received \$36.

Figure 3.5e shows a base item and a corresponding pharmacy item for a prescription which was written on May 20, 1981 and filled on the same date. The drug, THEODUR, falls into the drug class 1940 (antiasthmatics/bronchodilators). The child received a 30-day supply of the drug.

Figure 3.5a: The Fields in the Base Master System

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
-4 FORM COUNT	NUM	4	Required	4	2	8
5 SPEC CODE	COD	1.040	Required	5	1	9
6 SERVICE TYPE	COD	1.008	Required	6	1	10
7 VENDOR NO.	NUM	5	Required	7	4	14
8 STATUS	ALP	5	Required	8	4	18
9 PATIENT ID	ALP	11	Optional	9	8	26
10 BATCH	TEX	1	Required	10	1	27
11 RACE	COD	1.009	Required	11	1	28
12 SEX	COD	1.003	Required	12	1	29
13 YBIRTH	COD	60.081	Required	13	1	30
14 CTEGRY	COD	0.099	Required	14	1	31
15 INSTITUTION	TEX	1	Required	15	1	32
16 STAR-DATE	DAT	8	Required	16	2	34
17 END--DATE	DAT	8	Required	17	2	36
18 D1	COD	0.255	Required	18	1	37
19 D2	COD	0.255	Optional	19	1	38
20 D3	COD	0.255	Optional	20	1	39
21 D4	COD	0.255	Optional	21	1	40
22 TYPE SERVICE	TEX	1	Required	22	1	41
23 TOT-COST	TOT	5	Required	23	4	45
24 PHAR-FEE	TOT	5	Optional	24	4	49
25 PAY-MEDICAID	TOT	5	Required	25	4	53
26 INCREMENTS	NUM	2	Form	26	2	55

Figure 3.5b: The Fields in the Service Form System

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
-4 FORM COUNT	NUM	4	Required	4	2	8
5 SERVICE TYPE	COD	1.008	Required	5	1	9
6 DATE-SERV	DAT	8	Required	6	2	11
7 MODIFY PROC	COD	0.099	Optional	7	1	12
8 DAYS SERVICE	COD	0.255	Required	8	1	13
9 PROCEDURE COD	ALP	5	Required	9	4	17
10 CODE SERVICE	COD	0.099	Required	10	1	18
11 CHA-VEND	TOT	5	Required	11	4	22
12 PAY-VEND	TOT	5	Required	12	4	26

Figure 3.5c: The Fields in the Pharmacy Form System

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
-4 FORM COUNT	NUM	4	Required	4	2	8
5 MANUFACTURER	NUM	5	Required	5	4	12
6 PRODUCT	TEX	4	Required	6	4	16
7 RX1	NUM	4	Optional	7	2	18
8 RX2	NUM	4	Optional	8	2	20
9 RX3	NUM	4	Optional	9	2	22
10 RX4	NUM	4	Optional	10	2	24
11 WRIT-DATE	DAT	8	Required	11	2	26
12 FILL-DATE	DAT	8	Required	12	2	28
13 DAYS SUPPLIED	COD	0.255	Required	13	1	29
14 TOT-PAID	TOT	5	Required	14	4	33
34 CHRS/ITE, 15 ITE/REC						

Figure 3.5d: Items from the Base and Service Systems

CASE-NUMBER : 20003504
 BYEAR : 67
 TIE : 0
 FORM COUNT : 2052
 SPEC CODE : 28
 SERVICE TYPE : 5
 VENDOR NO. : 00030
 STATUS :
 PATIENT ID : 2484789
 BATCH : 6
 RACE : 2
 SEX : 2
 YBIRTH : 67
 CTEGRY : 2
 INSTITUTION : 1
 STAR-DATE : 81/04/23
 END--DATE : 81/04/23
 D1 : 46
 D2 : 0
 D3 : 0
 D4 : 0
 TYPE SERVICE : 0
 TOT-COST : 74.
 PHAR-FEE : 0.
 PAY-MEDICAID : 70.
 INCREMENTS : 02

CASE-NUMBER : 20003504
 BYEAR : 67
 TIE : 0
 FORM COUNT : 2052
 SERVICE TYPE : 5
 DATE-SERV : 81/04/23
 MODIFY PROC : 0
 DAYS SERVICE : 1
 PROCEDURE COD :
 CODE SERVICE : 22
 CHA-VEND : 35.
 PAY-VEND : 33.

CASE-NUMBER : 20003504
 BYEAR : 67
 TIE : 0
 FORM COUNT : 2052
 SERVICE TYPE : 5
 DATE-SERV : 81/04/23
 MODIFY PROC : 0
 DAYS SERVICE : 1
 PROCEDURE COD :
 CODE SERVICE : 28
 CHA-VEND : 39.
 PAY-VEND : 36.

Figure 3.5e: Items from the Base and Pharmacy Systems

CASE-NUMBER	:	20003504
BYEAR	:	67
TIE	:	0
FORM COUNT	:	2041
SPEC CODE	:	23
SERVICE TYPE	:	2
VENDOR NO.	:	03562
STATUS	:	89999
PATIENT ID	:	2205034
BATCH	:	2
RACE	:	2
SEX	:	2
YBIRTH	:	67
CTEGRY	:	2
INSTITUTION	:	1
STAR-DATE	:	81/05/20
END--DATE	:	81/05/20
D1	:	0
D2	:	0
D3	:	0
D4	:	0
TYPE SERVICE	:	
TOT-COST	:	0.
PHAR-FEE	:	0.
PAY-MEDICAID	:	9.
INCREMENTS	:	01
CASE-NUMBER	:	20003504
BYEAR	:	67
TIE	:	0
FORM COUNT	:	2041
MANUFACTURER	:	00369
PRODUCT	:	0803
RX1	:	1940
RX2	:	0000
RX3	:	0000
RX4	:	0000
WRIT-DATE	:	81/05/20
FILL-DATE	:	81/05/20
DAYS SUPPLIED	:	30
TOT-PAID	:	0.

3.6. The Summary Systems

One of the principal tasks of our study was to prepare numerous statistical tables. We could have approached this task by writing a special program for each table, or by utilizing INFORM's general-purpose table-generating commands. The first approach would have necessitated the preparation and checking out of a very large number of programs. We chose the latter approach. In order to use the general-purpose capability of INFORM to generate tables, it was first necessary to write special programs which created summary information in fixed field and fixed length records suitable for incorporation into INFORM's files.

Eleven summary systems were established, each of which was incorporated as a form of the eligibility super-system. Figure 3.6a outlines the information contained in each system.

Figure 3.6a: The Summary Systems

System	Fields	Contents
LB	29	MD services; admissions; OPD and ER utilization
LC	30	Pediatric services; EPSDT visits; ER, OPD and INPT information.
LD	30	Home health, dental, optometry and laboratory services
LE	30	Diagnoses
LF	30	Diagnoses
LG	25	Physical therapy; asthma; otitis; drugs
LH	28	Services during second half of FY80 and FY81
LI	30	Services during second half of FY80 and FY81
LJ	30	CY data
LK	30	CY data
LL	30	Providers, continuity of care, ambulatory services, drugs, totals

The fields in each of these systems are shown in Figures 3.6b to 3.6L. The rules for creating five of these fields are given in Figures 3.6a1 to 3.6a5. Figure 3.6a1 presents the rules for determining how to count an emergency room visit. Information was drawn from both base and service records. STAR-DATE, SERVICE TYPE and VENDOR NUMBER were taken from the base records, while CODE SERVICE and PAY-VEND were taken from the service records.

The first step in determining if a service should be counted as an ER visit was to check whether the date of service fell within our study period. Next, the base record was checked to see whether the SERVICE TYPE was 5, which indicated that it was a hospital service, and whether the VENDOR NO. was not 00006, the code for Johns Hopkins Hospital where ER visits were coded differently. If the above conditions were met, and there was a CODE SERVICE of 28 (emergency) in the service records corresponding to that particular base record, then the service was counted as an emergency room visit.

Since Johns Hopkins Hospital coded both clinic visits and emergency room visits as clinic visits (CODE SERVICE:18), modifications had to be made in our coding in order to classify these visits by type. A sampling of hospital records for visits occurring during the study period indicated that visits with a PAY-VEND corresponding to the CODE SERVICE:18 of less than \$65 were generally routine clinic visits, while those with a fee of \$65 or more were generally emergency room visits. These fees represent payment for only the facility component of the visit. Based on these observations, a service occurring at Johns

Figure 3.6a1: System LC (Figure 3.6c)

FIELD: VER- Number of emergency room visits

Sources of information:

SYSTEM	FIELD HEAD
-----	-----
P0	STAR-DATE
P0	SERVICE TYPE
P0	VENDOR NO.
PA	CODE SERVICE
PA	PAY-VEND

A VER was counted if the following conditions were met:

Start-date between 80/07/01 and 81/06/30

AND

[SERVICE TYPE: 5 (hospital service) and CODE SERVICE: 28
(emergency service) and VENDOR NO.<>00006 (Johns Hopkins
Hospital, which coded emergency room visits differently)

OR

SERVICE TYPE: 5 and CODE SERVICE: 18 and VENDOR NO.: 00006
and CODE SERVICE: 18 and PAY-VEND>65].

Figure 3.6a2: System LC (Figure 3.6c)

FIELD: P\$VER - Payment for emergency room visits

Sources of information:

SYSTEM	FIELD HEAD
-----	-----
P0	STAR-DATE
P0	SERVICE TYPE
P0	VENDOR NO.
P0	TYPE SERVICE
PA	CODE SERVICE
PA	PAY-VEND

All values of PAY-VEND were added for services associated with VER (above), in addition to payments associated with physician services in the emergency room, which were determined as follows:

Start-date between 80/07/01 and 81/06/30

AND

[SERVICE TYPE: 1 and TYPE SERVICE: E and [VENDOR NO.<>00006 and VENDOR NO.<>00030]]

OR

[SERVICE TYPE: 1 and TYPE SERVICE: E and [VENDOR NO.: 00006 or VENDOR NO.: 00030] for dates corresponding to dates of emergency room visits].

Figure 3.6a3: System LF (Figure 3.6f)

FIELD: INJURIES - Number of services which were coded with a diagnosis of "other injuries due to accidents or violence".

Sources of information:

SYSTEM	FIELD HEAD
-----	-----
P0	D1
P0	D2
P0	D3
P0	D4

A service for INJURIES was counted if:

START-DATE BETWEEN 80/07/01 AND 81/06/30

AND

[D1: 97

OR

D2: 97

OR

D3: 97

OR

D4: 97]

Figure 3.6a4: System LG (Figure 3.6g)

FIELD: ER-ASTHMA - Number of emergency room visits for asthma

Sources of information

SYSTEM	FIELD HEAD
-----	-----
P0	STAR-DATE
P0	SERVICE TYPE
P0	D1
PA	CODE SERVICE
PA	PAY-VEND
PA	DATE-SERV
PB	RX1
PB	WRIT-DATE

ER-ASTHMA was counted if the following conditions were met:

VER (as described above) with D1: 51 (diagnosis of influenza, emphysema, asthma and other diseases of the respiratory system)

AND

RX1: 1940 (prescription for asthmatics/bronchodilators) within two days of the emergency room visit.

Figure 3.6a5: System LL (Figure 3.6L)

FIELD: P\$GRAND-TOTAL - Total payment for services received during FY 1981.

Sources of information:

SYSTEM	FIELD HEAD
-----	-----
P0	STAR-DATE
P0	PAY-MEDICAID

All values of PAY-MEDICAID were added for items with a START-DATE between 80/07/01 and 81/06/30.

Hopkins Hospital was coded as emergency room visit if the SERVICE TYPE was 5, the CODE SERVICE was 18, and the corresponding PAY-VEND was 65 or above.

Figure 3.6a4 presents the rules for determining how to count an asthma-related emergency room visit. Information was taken from base records (STAR-DATE, SERVICE TYPE, D1), service records (CODE SERVICE, PAY-VEND, DATE-SERV) and pharmacy records (RX1, WRIT-DATE).

The rules described above for identifying an ER visit were also used in identifying an ER visit for asthma. In addition, it was necessary to determine that asthma was the reason for the visit. Since the diagnosis category for asthma (D1:51) also contained several other conditions ("influenza, emphysema, asthma and other diseases of the respiratory system") it was necessary to determine which visits were for asthma rather than for the other diseases. This was accomplished through the use of drug codes contained in the pharmacy record. We assumed that a diagnosis of 51, combined with a prescription for "asthma/bronchodilators" (RX1:1940) made it likely that an ER visit was asthma-related. To allow for possible errors on the part of the physician in dating the prescription, a prescription written within two days of a visit date was considered to be associated with that visit.

The rules for counting payments for emergency room visits, visits with a diagnosis of "injuries" and total payments for services received during FY 1981 are presented in Figures 3.6a2, 3.6a3, and 3.6a5, respectively. As shown in Figures 3.6b through 3.6l, a total of 352 such summary variables were created for the purposes of this study.

Figure 3.6b The Fields in the Summary System LB

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 FORM-COUNT	NUM	4	Required	4	2	8
5 OFFICE-MD	COD	0.099	Optional	5	1	9
6 C\$OFFICE-MD	TOT	5	Optional	6	4	13
7 P\$OFFICE-MD	TOT	5	Optional	7	4	17
8 OPD-MD	COD	0.099	Optional	8	1	18
9 C\$OPD-MD	TOT	5	Optional	9	4	22
10 P\$OPD-MD	TOT	5	Optional	10	4	26
11 INPT-MD	COD	0.099	Optional	11	1	27
12 C\$INPT-MD	TOT	5	Optional	12	4	31
13 P\$INPT-MD	TOT	5	Optional	13	4	35
14 ER-MD	COD	0.099	Optional	14	1	36
15 C\$ER-MD	TOT	5	Optional	15	4	40
16 P\$ER-MD	TOT	5	Optional	16	4	44
17 ADMISSIONS	COD	0.099	Optional	17	1	45
18 DAYS-INPT	COD	1.255	Optional	18	1	46
19 C\$DAYS-INPT	TOT	6	Optional	19	4	50
20 P\$DAYS-INPT	TOT	6	Optional	20	4	54
21 VOPD	COD	0.099	Optional	21	1	55
22 C\$VOPD	TOT	5	Optional	22	4	59
23 P\$VOPD	TOT	5	Optional	23	4	63
24 VER	COD	0.099	Optional	24	1	64
25 C\$VER	TOT	5	Optional	25	4	68
26 P\$VER	TOT	5	Optional	26	4	72
27 NOPD	COD	0.099	Optional	27	1	73
28 NINPT	COD	0.099	Optional	28	1	74
29 NER	COD	0.099	Optional	29	1	75

Figure 3.6c The Fields in the Summary System LC

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 SERVICE RECORDS	NUM	4	Required	4	2	8
5 PED	COD	0.099	Optional	5	1	9
6 CSPED	TOT	5	Optional	6	4	13
7 P\$PED	TOT	5	Optional	7	4	17
8 EPSDT-OFFICE	COD	0.099	Optional	8	1	18
9 C\$EPSDT-OFF	TOT	5	Optional	9	4	22
10 P\$EPSDT-OFF	TOT	5	Optional	10	4	26
11 HEALTH-OFFICE	COD	0.099	Optional	11	1	27
12 C\$HEALTH-OFF	TOT	5	Optional	12	4	31
13 P\$HEALTH-OFF	TOT	5	Optional	13	4	35
14 URI-ER	COD	0.099	Optional	14	1	36
15 C\$URI-ER	TOT	5	Optional	15	4	40
16 P\$URI-ER	TOT	5	Optional	16	4	44
17 HEALTH-OPD	COD	0.099	Optional	17	1	45
18 C\$HEALTH-OPD	TOT	5	Optional	18	4	49
19 P\$HEALTH-OPD	TOT	5	Optional	19	4	53
20 VER	COD	0.099	Optional	20	1	54
21 C\$VER	TOT	5	Optional	21	4	58
22 P\$VER	TOT	5	Optional	22	4	62
23 VCLINIC	COD	0.099	Optional	23	1	63
24 C\$VCLINIC	TOT	5	Optional	24	4	67
25 P\$VCLINIC	TOT	5	Optional	25	4	71
26 C\$OPD	TOT	5	Optional	26	4	75
27 P\$OPD	TOT	5	Optional	27	4	79
28 INPT	COD	0.099	Optional	28	1	80
29 C\$INPT	TOT	5	Optional	29	4	84
30 P\$INPT	TOT	5	Optional	30	4	88

Figure 3.6d The Fields in the Summary System LD

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 PHARMACY RECDS	NUM	4	Required	4	2	8
5 HOME HEALTH	COD	0.099	Optional	5	1	9
6 C\$HOME HEALTH	TOT	5	Optional	6	4	13
7 P\$HOME HEALTH	TOT	5	Optional	7	4	17
8 AUDIOLOGY	COD	0.099	Optional	8	1	18
9 C\$AUDIOLOGY	TOT	5	Optional	9	4	22
10 P\$AUDIOLOGY	TOT	5	Optional	10	4	26
11 LABORATORY	COD	0.099	Optional	11	1	27
12 C\$LABORATORY	TOT	5	Optional	12	4	31
13 P\$LABORATORY	TOT	5	Optional	13	4	35
14 OTHER SERV	COD	0.099	Optional	14	1	36
15 C\$OTHER SERV	TOT	5	Optional	15	4	40
16 P\$OTHER SERV	TOT	5	Optional	16	4	44
17 OPTOMETRY	COD	0.099	Optional	17	1	45
18 C\$OPTOMETRY	TOT	5	Optional	18	4	49
19 P\$OPTOMETRY	TOT	5	Optional	19	4	53
20 DENTIST	COD	0.099	Optional	20	1	54
21 C\$DENTIST	TOT	5	Optional	21	4	58
22 P\$DENTIST	TOT	5	Optional	22	4	62
23 PREV-DENTIST	COD	0.099	Optional	23	1	63
24 C\$PREV-DENTIST	TOT	5	Optional	24	4	67
25 P\$PREV-DENTIST	TOT	5	Optional	25	4	71
26 ACUTE-DENTIST	COD	0.099	Optional	26	1	72
27 C\$ACUTE-DENTIST	TOT	5	Optional	27	4	76
28 P\$ACUTE DENTIST	TOT	5	Optional	28	4	80
29 NDENTISTS	COD	0.099	Optional	29	1	81
30 NPREV-DENTIST	COD	0.099	Optional	30	1	82

Figure 3.6e The Fields in the Summary System LE

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 FORM-COUNT	NUM	4	Required	4	2	8
5 TB	COD	0.099	Optional	5	1	9
6 SYPHILIS	COD	0.099	Optional	6	1	10
7 INFEC/PARAS	COD	0.099	Optional	7	1	11
8 MALIGNANCIES	COD	0.099	Optional	8	1	12
9 LYMPH/NEOPL	COD	0.099	Optional	9	1	13
10 BENIGN NEOPL	COD	0.099	Optional	10	1	14
11 NEOPLASM-UNSP	COD	0.099	Optional	11	1	15
12 DIABETES	COD	0.099	Optional	12	1	16
13 NUTRITION	COD	0.099	Optional	13	1	17
14 METABOLIC DIS	COD	0.099	Optional	14	1	18
15 BLOOD DISEASE	COD	0.099	Optional	15	1	19
16 RETARDATION	COD	0.099	Optional	16	1	20
17 MENTAL DISORD	COD	0.099	Optional	17	1	21
18 ALCOHOLISM	COD	0.099	Optional	18	1	22
19 DRUG DEPENDENCE	COD	0.099	Optional	19	1	23
20 CNS	COD	0.099	Optional	20	1	24
21 EYE	COD	0.099	Optional	21	1	25
22 EAR	COD	0.099	Optional	22	1	26
23 RHEUM FEVER	COD	0.099	Optional	23	1	27
24 HYPERTENTION	COD	0.099	Optional	24	1	28
25 MYOCARD INFAR	COD	0.099	Optional	25	1	29
26 HEART DISEASE	COD	0.099	Optional	26	1	30
27 CEREBROVASCUL	COD	0.099	Optional	27	1	31
28 ARTERIES	COD	0.099	Optional	28	1	32
29 URI	COD	0.099	Optional	29	1	33
30 PNEUMONIA	COD	0.099	Optional	30	1	34

Figure 3.6f The Fields in the Summary System LF

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 FORM-COUNT	NUM	4	Required	4	2	8
5 TONSILS	COD	0.099	Optional	5	1	9
6 INFLUENZA	COD	0.099	Optional	6	1	10
7 TEETH	COD	0.099	Optional	7	1	11
8 ULCER	COD	0.099	Optional	8	1	12
9 UPPER GI	COD	0.099	Optional	9	1	13
10 APPENDICITIS	COD	0.099	Optional	10	1	14
11 HERNIA	COD	0.099	Optional	11	1	15
12 INTEST/PERIT	COD	0.099	Optional	12	1	16
13 CHOLELITHIASIS	COD	0.099	Optional	13	1	17
14 LIVER/GALL/PAN	COD	0.099	Optional	14	1	18
15 GENITOURINARY	COD	0.099	Optional	15	1	19
16 COMPLIC PREG	COD	0.099	Optional	16	1	20
17 ABORTION	COD	0.099	Optional	17	1	21
18 DELIVERY	COD	0.099	Optional	18	1	22
19 PUERPERIUM	COD	0.099	Optional	19	1	23
20 PREGNANCY	COD	0.099	Optional	20	1	24
21 SKIN DISEASES	COD	0.099	Optional	21	1	25
22 MUSCULOSKELETAL	COD	0.099	Optional	22	1	26
23 ANOMALIES	COD	0.099	Optional	23	1	27
24 DYSMATURITY	COD	0.099	Optional	24	1	28
25 BIRTH-INJURY	COD	0.099	Optional	25	1	29
26 SYMPTOMS	COD	0.099	Optional	26	1	30
27 FRACTURES	COD	0.099	Optional	27	1	31
28 BURNS	COD	0.099	Optional	28	1	32
29 INJURIES	COD	0.099	Optional	29	1	33
30 POISONINGS	COD	0.099	Optional	30	1	34

Figure 3.6g The Fields in the Summary System LG

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 BASE RECORDS	NUM	4	Required	4	2	8
5 OFF-EPSDT	COD	0.099	Optional	5	1	9
6 <2-OFF-EPSDT	COD	0.099	Optional	6	1	10
7 >2-OFF-EPSDT	COD	0.099	Optional	7	1	11
8 PHYSICAL-THER	COD	0.099	Optional	8	1	12
9 C\$PHYSICAL-THER	TOT	5	Optional	9	4	16
10 P\$PHYSICAL-THER	TOT	5	Optional	10	4	20
11 ASTHMA	COD	0.099	Optional	11	1	21
12 NO-ER-ASTHMA	COD	0.099	Optional	12	1	22
13 ER-ASTHMA	COD	0.099	Optional	13	1	23
14 OTITIS	COD	0.099	Optional	14	1	24
15 NO-OTITIS-AUD	COD	0.099	Optional	15	1	25
16 AUDIOM-OTITIS	COD	0.099	Optional	16	1	26
17 URI	COD	0.099	Optional	17	1	27
18 ANTIBIOTICS-URI	COD	0.099	Optional	18	1	28
19 INSULIN	COD	0.099	Optional	19	1	29
20 TETRACYCLINE	COD	0.099	Optional	20	1	30
21 SICKLE-SCREEN	COD	0.099	Optional	21	1	31
22 RHEUMATIC-F/H	COD	0.099	Optional	22	1	32
23 PENICILLIN-RHEU	COD	0.099	Optional	23	1	33
24 CHLORAMPHEN-URI	COD	0.099	Optional	24	1	34
25 PNEU-CHLORAMPH	COD	0.099	Optional	25	1	35

Figure 3.6h The Fields in the Summary System LH

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 FORM-COUNT	NUM	4	Required	4	2	8
5 BOFFICE	COD	0.099	Optional	5	1	9
6 CSBOFFICE	TOT	5	Optional	6	4	13
7 P\$BOFFICE	TOT	5	Optional	7	4	17
8 BOPD	COD	0.099	Optional	8	1	18
9 CSBOPD	TOT	5	Optional	9	4	22
10 P\$BOPD	TOT	5	Optional	10	4	26
11 BER	COD	0.099	Optional	11	1	27
12 CSBER	TOT	5	Optional	12	4	31
13 P\$BER	TOT	5	Optional	13	4	35
14 BTOTAL	COD	0.099	Optional	14	1	36
15 C\$BTOTAL	TOT	6	Optional	15	4	40
16 P\$BTOTAL	TOT	6	Optional	16	4	44
17 AOFFICE	COD	0.099	Optional	17	1	45
18 C\$AOFFICE	TOT	5	Optional	18	4	49
19 P\$AOFFICE	TOT	5	Optional	19	4	53
20 AOPD	COD	0.099	Optional	20	1	54
21 C\$AOPD	TOT	5	Optional	21	4	58
22 P\$AOPD	TOT	5	Optional	22	4	62
23 AER	COD	0.099	Optional	23	1	63
24 C\$AER	TOT	5	Optional	24	4	67
25 P\$AER	TOT	5	Optional	25	4	71
26 ATOTAL	COD	0.099	Optional	26	1	72
27 C\$ATOTAL	TOT	6	Optional	27	4	76
28 P\$ATOTAL	TOT	6	Optional	28	4	80

Figure 3.6i The Fields in the Summary System LI

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 FORM-COUNT	NUM	4	Required	4	2	8
5 BADMISSIONS	COD	0.099	Optional	5	1	9
6 BDAYS	COD	0.255	Optional	6	1	10
7 BAMBULATORY	COD	0.099	Optional	7	1	11
8 C\$BAMBULATORY	TOT	5	Optional	8	4	15
9 P\$BAMBULATORY	TOT	5	Optional	9	4	19
10 BPEDIATRICIANS	COD	0.099	Optional	10	1	20
11 C\$BPED	TOT	5	Optional	11	4	24
12 P\$BPED	TOT	5	Optional	12	4	28
13 B\$TYPE-UPC	COD	0.009	Optional	13	1	29
14 B&TYPE-UPC	COD	0.255	Optional	14	1	30
15 BUPC	COD	0.255	Optional	15	1	31
16 BPRESRIPTIONS	COD	0.255	Optional	16	1	32
17 P\$BPRESCRIP	TOT	5	Optional	17	4	36
18 AAMBULATORY	COD	0.099	Optional	18	1	37
19 C\$AAMBULATORY	TOT	5	Optional	19	4	41
20 P\$AAMBULATORY	TOT	5	Optional	20	4	45
21 APEDIATRICIAN	COD	0.099	Optional	21	1	46
22 C\$APED	TOT	5	Optional	22	4	50
23 P\$APED	TOT	5	Optional	23	4	54
24 AADMISSIONS	COD	0.099	Optional	24	1	55
25 ADAYS	COD	0.255	Optional	25	1	56
26 A\$TYPE-UPC	COD	0.009	Optional	26	1	57
27 A&TYPE-UPC	COD	0.255	Optional	27	1	58
28 AUPC	COD	0.255	Optional	28	1	59
29 APRESRIPTIONS	COD	0.255	Optional	29	1	60
30 P\$APRESCRIP	TOT	5	Optional	30	4	64

Figure 3.6j The Fields in the Summary System LJ

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
-4 CARE-NON-JHH	COD	0.001	Optional	4	1	7
5 CLINIC-JHH	COD	0.099	Optional	5	1	8
6 C\$CLINIC-JHH	TOT	5	Optional	6	4	12
7 P\$CLINIC-JHH	TOT	5	Optional	7	4	16
8 C&Y	COD	0.099	Optional	8	1	17
9 C\$C&Y	TOT	5	Optional	9	4	21
10 P\$C&Y	TOT	5	Optional	10	4	25
11 ER-JHH	COD	0.099	Optional	11	1	26
12 C\$ER-JHH	TOT	5	Optional	12	4	30
13 P\$ER-JHH	TOT	5	Optional	13	4	34
14 ADM-JHH	COD	0.099	Optional	14	1	35
15 DAYS-JHH	COD	0.255	Optional	15	1	36
16 C\$DAYS-JHH	TOT	6	Optional	16	4	40
17 P\$DAYS-JHH	TOT	6	Optional	17	4	44
18 DENTAL-JHH	COD	0.099	Optional	18	1	45
19 C\$DENTAL-JHH	TOT	5	Optional	19	4	49
20 P\$DENTAL-JHH	TOT	5	Optional	20	4	53
21 ASTHMA-JHH	COD	0.001	Optional	21	1	54
22 NO-ER-ASTHMA	COD	0.099	Optional	22	1	55
23 ER-ASTHMA	COD	0.099	Optional	23	1	56
24 URI-ER	COD	0.099	Optional	24	1	57
25 C\$TOTAL-JHH	TOT	6	Optional	25	4	61
26 P\$TOTAL-JHH	TOT	6	Optional	26	4	65
27 PRESCRIPTIONS	COD	0.099	Optional	27	1	66
28 P\$PRESCRIPTIONS	TOT	5	Optional	28	4	70
29 C\$GRAND-TOTAL	TOT	6	Optional	29	4	74
30 P\$GRAND-TOTAL	TOT	6	Optional	30	4	78

Figure 3.6k The Fields in the Summary System LK

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.005	Required	3	1	6
-4 FORM COUNT	NUM	4	Required	4	2	8
5 XOFFICE-VISITS	COD	0.099	Optional	5	1	9
6 CSXOFFICE	TOT	5	Optional	6	4	13
7 PSXOFFICE	TOT	5	Optional	7	4	17
8 XCLINIC-VISITS	COD	0.099	Optional	8	1	18
9 CSXCLINIC	TOT	5	Optional	9	4	22
10 PSXCLINIC	TOT	5	Optional	10	4	26
11 XER-VISITS	COD	0.099	Optional	11	1	27
12 CSXER	TOT	5	Optional	12	4	31
13 PSXER	TOT	5	Optional	13	4	35
14 XADMISSIONS	COD	0.099	Optional	14	1	36
15 XDAYS	COD	0.255	Optional	15	1	37
16 CSXDAYS	TOT	6	Optional	16	4	41
17 PSXDAYS	TOT	6	Optional	17	4	45
18 XDENTAL	COD	0.099	Optional	18	1	46
19 CSXDENTAL	TOT	5	Optional	19	4	50
20 PSXDENTAL	TOT	5	Optional	20	4	54
21 XNO-ER-ASTHMA	COD	0.099	Optional	21	1	55
22 XER-ASTHMA	COD	0.099	Optional	22	1	56
23 XURI-ER	COD	0.099	Optional	23	1	57
24 CSXTOTAL	TOT	6	Optional	24	4	61
25 PSXTOTAL	TOT	6	Optional	25	4	65
26 ASTHMA	COD	0.001	Optional	26	1	66
27 PRESCRIPTIONS	COD	0.099	Optional	27	1	67
28 P\$PRESCRIPTIONS	TOT	5	Optional	28	4	71
29 C\$GRAND-TOTAL	TOT	6	Optional	29	4	75
30 P\$GRAND-TOTAL	TOT	6	Optional	30	4	79

Figure 3.6L The Fields in the Summary System LL

FD HEAD	TYP	MAX	REQUIREMENT	PR	LEN	CUM
-1 CASE-NUMBER	NUM	8	Required	1	4	4
-2 BYEAR	COD	60.081	Required	2	1	5
-3 TIE	COD	0.009	Required	3	1	6
-4 TYPE-UPC	COD	0.004	Optional	4	1	7
5 PROP-TYPE-UPC	COD	0.256	Optional	5	1	8
6 UPC	COD	0.255	Optional	6	1	9
7 SECON	COD	0.256	Optional	7	1	10
8 PRIMARY-SECON	COD	0.256	Optional	8	1	11
9 GENERALIST	COD	3.003	Optional	9	1	12
10 %GENERALIST	COD	0.255	Optional	10	1	13
11 NON-GENERALIST	COD	3.003	Optional	11	1	14
12 %NON-GENERALIST	COD	0.255	Optional	12	1	15
13 MD-SERVICES	COD	0.255	Optional	13	1	16
14 C\$MD-SERVICES	TOT	5	Optional	14	4	20
15 P\$MD-SERVICES	TOT	5	Optional	15	4	24
16 AMBULATORY	COD	3.003	Optional	16	1	25
17 C\$AMBULATORY	TOT	6	Optional	17	4	29
18 P\$AMBULATORY	TOT	6	Optional	18	4	33
19 SPECIAL-SERV	COD	0.099	Optional	19	1	34
20 C\$SPECIAL-SERV	TOT	5	Optional	20	4	38
21 P\$SPECIAL-SERV	TOT	5	Optional	21	4	42
22 TOTAL-SERVICES	COD	3.003	Optional	22	1	43
23 C\$TOTAL-SERV	TOT	6	Optional	23	4	47
24 P\$TOTAL-SERV	TOT	6	Optional	24	4	51
25 PRESCRIPTIONS	COD	3.003	Optional	25	1	52
26 P\$PRESCRIPTIONS	TOT	6	Optional	26	4	56
27 GRAND-TOTAL	COD	3.003	Optional	27	1	57
28 C\$GRAND-TOTAL	TOT	7	Optional	28	4	61
29 P\$GRAND-TOTAL	TOT	7	Optional	29	4	65
30 FACILITIES-AMBU	COD	0.099	Optional	30	1	66

2.7. Generation of Tables

To generate a table in INFORM, the user puts the the desired characteristics of the table in a file, called the definitions file. Program INFTAB, one of INFORM's programs, is entirely devoted to the generation of tables. It reads the definitions file, does the appropriate counting in the specified systems, and then prints the resulting tables.

INFTAB can generate multi-dimensional tables, although in this study we have generated only two-dimensional tables. In addition to specifying the fields which are counted for each dimension, the user may prescribe fields which act as constraints during the counting process. The methodology is best explained with an example. We will first consider the definitions in lines 1000 to 3205 of Figure 3.7a and the results in Figure 3.7b.

Line 1000 indicates that system 01LL (the payments summary system of the first county - Allegany) be used. The asterisk (*) following 01LL means that master system 01L0 (the children system) should also be used. Line 1001 gives the desired name of the table, and specifies that there are two constraints and two dimensions.

The first constraint is in lines 2100-2100. Line 2100 gives the name of the constraint (SMONTHS), its head in 01L0 (SM), and the number of intervals to be constrained (1). Line 2010 gives the details on the first constraint (the only one in this case): 1-12 is the name, 1 is the beginning of the interval and 12 is its end.

Lines 2200-2201 give similar information on the second constraint - the birth year in 01L0.

Lines 3100-3205 deal with the two dimensions. The first (lines 3100-3109) is called GRAND-TOT PAYMENTS, comes from a field in 01LL (with the head P\$GRAND-TOT), and has 9 intervals. The intervals are specified in lines 3101-3109. Similar definitions apply to the second dimension in lines 3200-3209.

The results are shown in Figure 3.7b. A careful comparison of the entries in the definition file and the results will reveal that they are identical. Note that no other specifications were made regarding the layout of the resulting table, the separating marks, or the need to compute totals, percentages, means, and standard deviations. These were done automatically by program INFTAB.

The other definitions in Figure 3.7a have to do specifically with our study. INFTAB was extended to allow for the generation of tables for numerous counties, HSAs, and the whole state. The notations \Y\N, \N\Y, etc., have to do with the printing of county and/or HSA tables. Figures 3.7c to 3.7e show results for counties 10, 11, and 21 (Frederick, Garrett, and Washington). The totals for Western Maryland HSA is in Figure 3.7f. We do not show the details for other counties. Figures 3.7g to 3.7k give the totals for the other HSA's and Figure 3.7L gives the totals for Maryland.

By changing lines 3200-3205 in Figure 3.7a (which apply to the ages of children), similar tables can be obtained for the race and sex of children.

Figure 3.7m shows the definitions for race, and Figure 3.7n gives the corresponding last table for these definitions. Similarly, Figures 3.7o and 3.7p deal with sex.

The reader should note that the second line in each table gives the date and time it was produced. A few observations should now be recorded on this topic.

INFORM started the generation of Figures 3.7b to 3.7L at 11:10 PM on November 15, 1983 (83/11/15 23:10). It took 8 minutes to generate Figure 3.7b (4301 children in Allegany County). It then took 6 minutes (23:18 to 23:24) for Frederick County (3288 children in Figure 3.7d). A similar review of the times shows that it took 26 minutes for 13,676 in the WMHSA, 38 minutes for 12,516 in MCHSA, 120 for 39,783 in SM, 94 for 43,599 in CM, 27 for 19,281 in ES, 189 for 131,105 in Baltimore City, and 494 (or 8 hours and 14 minutes) for 259,960 children in Maryland.

The average number minutes to process 1000 children in the HSA's and in the state were 1.9, 3.0, 3.0, 2.2, 1.4, 1.4, and 1.9. Obviously, this number is not a constant. Since our computer serves many users, the processing times depend on the number of users and the demands they put on the computer's resources.

Figure 3.7a: Definitions File for Payments by Age Tables

```

01000      !,PGRA01.BAS>1;0,DB1:01LL*,-1601\Y\N
01001      !,GRAND TOTAL PAYMENTS BY AGE,2,2
02100      !,SMONTHS,SM*,1
02101      !,1-12,1,12
02200      !,BYEAR,BY*,1
02201      !,60-81,60,81
03100      !,GRAND-TOT PAYMENTS,P$GRAND-TOT,9
03101      !,0,0,0
03102      !,1-50,1,50
03103      !,51-100,51,100
03104      !,101-200,101,200
03105      !,201-500,201,500
03106      !,501-1000,501,1000
03107      !,1001-2500,1001,2500
03108      !,2501-5000,2501,5000
03109      !,>5000,5001,9999999
03200      !,AGE,DOB*,5
03201      !,<1,8007,8106
03202      !,1-5,7507,8006
03203      !,6-10,7007,7506
03204      !,11-15,6507,7006
03205      !," 16-20",6007,6506
09000      !,DB1:10LL,Y\N
09001      !,DB1:11LL,Y\N
09002      !,DB1:21LL,Y\Y\WMHSA
09003      !,DB1:15LL,N\Y\CMHSA
09004      !,DB1:161LL,N\N
09005      !,DB1:162LL,N\R\PRINCE GEORGES
09006      !,DB1:04LL,Y\N
09007      !,DB1:08LL,Y\N
09008      !,DB1:18LL,Y\Y\SMHSA
09009      !,DB1:02LL,Y\N
09010      !,DB1:03LL,Y\N
09011      !,DB1:06LL,Y\N
09012      !,DB1:12LL,Y\N
09013      !,DB1:13LL,Y\Y\CMHSA
09014      !,DB1:05LL,Y\N
09015      !,DB1:07LL,Y\N
09016      !,DB1:09LL,Y\N
09017      !,DB1:14LL,Y\N
09018      !,DB1:17LL,Y\N
09019      !,DB1:19LL,Y\N
09020      !,DB1:20LL,Y\N
09021      !,DB1:22LL,Y\N
09022      !,DB1:23LL,Y\Y\ESHSA
09023      !,DB1:301LL,N\N
09024      !,DB1:302LL,N\N
09025      !,DB1:303LL,N\N
09026      !,DB1:304LL,N\N
09027      !,DB1:305LL,N\N
09028      !,DB1:306LL,N\Y\BALTIMORE CITY\MARYLAND

```

Figure 3.7b: Total Payments by Age in Allegany County

TABLE 1601 : GRAND TOTAL PAYMENTS BY AGE IN SUML AND ALLEGHENY
TUE 83/11/15 23:18

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRC
<hr/>							
GRAND-TOT PAYMENTS :							
0 :	22	270	225	223	255 :	995	23
1-50 :	49	235	166	135	122 :	707	16
51-100 :	52	177	134	119	123 :	605	14
101-200 :	53	215	179	174	139 :	760	17
201-500 :	32	199	151	133	132 :	647	15
501-1000 :	28	83	36	34	68 :	249	5
1001-2500 :	35	66	31	22	112 :	266	6
2501-5000 :	8	12	7	4	18 :	49	1
>5000 :	10	7	3	0	3 :	23	0
<hr/>							
TOTAL :	289	1264	932	844	972 :	4301	100
PRCNT :	6.7	29.4	21.7	19.6	22.6 :	100.0	
<hr/>							
MEAN :	927.1	280.7	223.6	180.3	395.2 :	317.9	
S.D. :	3498.6	683.6	774.6	382.8	874.1 :	1149.2	

Figure 3.7c: Total Payments by Age in Frederick County

TABLE 1601 : GRAND TOTAL PAYMENTS BY AGE IN SUML AND FREDERICK
TUE 83/11/15 23:24

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRC
GRAND-TOT PAYMENTS :							
0 :	46	263	224	228	229 :	990	30
1-50 :	46	210	151	155	127 :	689	21
51-100 :	42	137	106	116	93 :	494	15
101-200 :	23	154	94	102	123 :	496	15
201-500 :	15	90	64	66	85 :	320	9
501-1000 :	10	27	16	12	51 :	116	3
1001-2500 :	8	26	8	10	75 :	127	3
2501-5000 :	3	5	1	2	15 :	26	0
>5000 :	12	7	2	1	8 :	30	0
TOTAL :	205	919	666	692	806 :	3288	100
PRCNT :	6.2	28.0	20.3	21.1	24.5 :	100.0	
MEAN :	950.9	298.7	132.8	122.5	439.1 :	303.1	
S.D. :	3817.6	2087.4	557.6	374.0	1375.5 :	1649.4	

Figure 3.7f: Total Payments by Age in Western Maryland HSA

TABLE 1601 : GRAND TOTAL PAYMENTS BY AGE IN WMHSA
TUE 83/11/15 23:36

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL	PRC
GRAND-TOT PAYMENTS :							
0 :	149	1055	832	882	911 :	3829	28
1-50 :	175	795	599	536	496 :	2601	19
51-100 :	165	554	444	466	368 :	1997	14
101-200 :	127	599	475	497	445 :	2143	15
201-500 :	78	433	344	377	402 :	1634	12
501-1000 :	51	170	81	92	204 :	598	4
1001-2500 :	69	147	65	54	315 :	650	4
2501-5000 :	22	32	12	15	61 :	142	1
>5000 :	33	19	8	4	18 :	82	0
TOTAL :	869	3804	2860	2923	3220 :	13676	100
PRCNT :	6.4	27.8	20.9	21.4	23.5 :	100.0	
MEAN :	775.9	254.9	167.6	159.1	388.8 :	280.8	
S.D. :	2964.1	1261.8	611.1	439.3	1027.3 :	1180.1	

Figure 3.7L: Total Payments by Age in Maryland

TABLE 1601 : GRAND TOTAL PAYMENTS BY AGE IN MARYLAND
WED 83/11/16 07:24

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

AGE :	<1	1-5	6-10	11-15	16-20 :	TOTAL PRC
GRAND-TOT PAYMENTS :	:	:	:	:	:	:
0 :	3563	21130	20503	20559	20301 :	86056 33
1-50 :	2482	12770	10813	9688	7724 :	43477 16
51-100 :	2008	10245	8275	7580	6100 :	34208 13
101-200 :	2110	11865	8616	8313	7660 :	38564 14
201-500 :	1558	10015	5910	6305	8406 :	32194 12
501-1000 :	629	2740	1286	1541	3174 :	9370 3
1001-2500 :	1004	2426	940	1129	5119 :	10618 4
2501-5000 :	444	612	229	336	1768 :	3389 1
>5000 :	571	537	188	217	571 :	2084 0
TOTAL :	14369	72340	56760	55668	60823 :	259960 100
PRCNT :	5.5	27.8	21.8	21.4	23.4 :	100.0
MEAN :	909.3	297.4	169.3	194.8	440.3 :	314.7
S.D. :	4447.1	1974.4	1128.9	1328.8	1502.1 :	1842.0

Figure 3.7m: Portion of Definition File for Payments by Race

```

03200    !,RACE,RACE*,2
03201    !,WHITE,1,1
03202    !,NONWHITE,2,9

```

Figure 3.7n: Total Payments by Race in Maryland

TABLE 1602 : GRAND TOTAL PAYMENTS BY RACE IN MARYLAND
THU 83/11/17 04:20

```

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

```

RACE :	WHITE	NONWHITE :	TOTAL	PRCNT
GRAND-TOT PAYMENTS :	:	:	:	:
0 :	29779	56277 :	86056	33.1
1-50 :	16345	27132 :	43477	16.7
51-100 :	12614	21594 :	34208	13.2
101-200 :	14232	24332 :	38564	14.8
201-500 :	12272	19922 :	32194	12.4
501-1000 :	4036	5334 :	9370	3.6
1001-2500 :	4439	6179 :	10618	4.1
2501-5000 :	1275	2114 :	3389	1.3
>5000 :	760	1324 :	2084	0.8
TOTAL :	95752	164208 :	259960	100.0
PRCNT :	36.8	63.2 :	100.0	
MEAN :	325.9	308.2 :	314.7	
S.D. :	1824.6	1852.1 :	1842.0	

Figure 3.7o: Portion of Definitions File for Payments by Sex

```

03200    !,SEX,SEX*,2
03201    !,"      MALE",1,1
03202    !,FEMALE,2,2

```

Figure 3.7p: Total Payments by Sex in Maryland

TABLE 1603 : GRAND TOTAL PAYMENTS BY SEX IN MARYLAND
FRI 83/11/18 23:09

```

SMONTHS :
  1-12 : 1 TO 12

BYEAR :
  60-81 : 60 TO 81

```

SEX :	MALE	FEMALE :	TOTAL	PRCNT
GRAND-TOT PAYMENTS :				
0 :	43631	42425 :	86056	33.1
1-50 :	21073	22404 :	43477	16.7
51-100 :	16511	17697 :	34208	13.2
101-200 :	18248	20316 :	38564	14.8
201-500 :	14683	17511 :	32194	12.4
501-1000 :	3991	5379 :	9370	3.6
1001-2500 :	3657	6961 :	10618	4.1
2501-5000 :	1172	2217 :	3389	1.3
>5000 :	1053	1031 :	2084	0.8
TOTAL :	124019	135941 :	259960	100.0
PRCNT :	47.7	52.3 :	100.0	
MEAN :	290.9	336.5 :	314.7	
S.D. :	1950.8	1736.6 :	1842.0	

3.8 Supporting Programs

The numerous supporting programs that were prepared during the course of the research work can be grouped as follows:

- (1) Exploratory Programs
- (2) Reading of Tapes
- (3) Checking, Merging, and Modifying Disk Files
- (4) Using the National Drug Code Directory
- (5) Preparation of Summary Systems
- (6) Inputting Eligibility, Payment, and Summary Data into INFORM
- (7) Generation of Tables and Summaries of Tables

Groups (1) to (5) were needed to prepare disk files in a format suitable for use in INFORM. In groups (6) and (7) appropriate changes were made in INFORM to read the files and to generate the tables.

(1) Exploratory Programs

Two types of exploratory programs were prepared. Those of the first type had to do with reading of selected portions of the initial eligibility and payment tapes in order to determine in detail how data is stored in them.

The second type of programs had to do with definitions of eligibility and payment systems in INFORM. These eventually lead to the systems described earlier in this chapter.

(2) Reading of Tapes

Here, too, two types of programs were written. The first type of programs converted EBCDIC-6250 b.p.i. tapes to

ASCII-800 b.p.i. tapes. The second type of programs converted the ASCII tapes to disk tapes.

During the process of conversion only selected records were retained. Eligibility and payment records were separated by counties, by master items, and by form items. For example, the payment record of every child was separated into a base record, service records, and pharmacy records.

(3) Checking, Merging, and Modifying Disk Files

As mentioned in Chapter 2, numerous errors were found in the initial data. Consequently, programs had to be prepared for checking the disk files and correcting errors. This phase of the work continued through May, 1984.

Programs had also to be written to merge payment data for individual children. These data were initially on three groups of tapes.

(4) Using the National Drug Code Directory

Special programs had to be written for reading a tape containing the National Drug Code Directory and placing it in a disk file. This file was then converted to a special file to enable very fast access to each item in the directory. Provision was also made to add missing items to the file.

An appropriate program then added drug codes to all pharmacy records.

(5) Preparation of Summary Systems

Considerable effort was devoted in preparing programs for the creation of the summary systems described in Section 3.6. Although only one program was needed for each summary system, many versions had to be written and checked out, before the program was found to be satisfactory.

Normally, we first had to prepare the payment systems in INFORM for several small counties. This enabled the review of individual children as well as the production of frequency counts.

(6) Inputting Eligibility, Payment, and Summary Data into INFORM

A new program, INFINP, was added to the INFORM package of programs, for reading eligibility, payment, and summary files. This program also checked the data for consistency and reported errors.

All the eligibility and summary data were actually read into INFORM. However, because of space limitations, payment data of only selected counties were read.

(7) Generation of Tables and Summaries of Tables

Program INFTAB in INFORM is used to generate tables (see Section 3.7). The original program, though, had to be modified to include two new major features: (1) Computation of means and standard deviations, and (2) Computations of subtotals for HSAs and totals for the state as a whole.

In addition, special programs were written to read the tables generated by INFTAB and prepare appropriate summaries. Examples of such summaries are given in figures 3.8c and 3.8d.

Figure 3.8c: Total Payments by HSA in Maryland

TABLE 1601 : GRAND TOTAL PAYMENTS BY HSA IN MARYLAND
TUE 83/11/15

SMONTHS :
1-12 : 1 TO 12

BYEAR :
60-81 : 60 TO 81

GRAND-TOT PAYMENTS	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO	TOT
0	3,829	4,527	14,927	14,503	5,650	42,620	86,0
%	28.0	36.2	37.5	33.3	29.3	32.5	33
1-50	2,601	1,953	6,745	7,765	3,639	20,774	43,4
%	19.0	15.6	17.0	17.8	18.9	15.9	16
51-100	1,997	1,531	5,133	5,824	2,803	16,920	34,2
%	14.6	12.2	12.9	13.4	14.5	12.9	13
101-200	2,143	1,780	5,219	6,266	3,013	20,143	38,5
%	15.7	14.2	13.1	14.4	15.6	15.4	14
201-500	1,634	1,613	4,095	5,216	2,075	17,561	32,1
%	12.0	12.9	10.3	12.0	10.8	13.4	12
501-1000	598	471	1,235	1,511	816	4,739	9,3
%	4.4	3.8	3.1	3.5	4.2	3.6	3
1001-2500	650	410	1,594	1,703	926	5,335	10,6
%	4.8	3.3	4.0	3.9	4.8	4.1	4
2501-5000	142	138	505	491	225	1,888	3,3
%	1.0	1.1	1.3	1.1	1.2	1.4	1
>5000	82	93	330	320	134	1,125	2,0
%	0.6	0.7	0.8	0.7	0.7	0.9	0
TOTAL	13,676	12,516	39,783	43,599	19,281	131,105	259,9
PRCNT	100.0	100.0	100.0	100.0	100.0	100.0	100
MEAN	280.8	320.9	323.3	299.8	296.1	322.8	314
S.D.	1180.1	2681.6	2437.7	1818.8	1390.3	1645.7	1842

Figure 3.8d: Mean Payments in Maryland by Age, Race, Sex, and HSA

MEAN PAYMENT FOR MEDICAID SERVICES RECEIVED DURING
FY 1981 BY AGE, RACE AND SEX. MEDICAID-ENROLLED
CHILDREN, FY 1981, MARYLAND.

Age, Race and Sex	:	WMHSA	MCHSA	SMHSA	CMHSA	ESHSA	BALTO:	TOTAL
-----+-----								
Age	:							

<1	:							
Mean	:	775.9	1333.7	951.5	966.1	790.6	871.4:	909.3
S.D.	:	2964.1	9657.7	5402.8	4348.4	3074.7	3559.6:	4447.1
1-5	:							
Mean	:	254.9	267.1	298.6	230.6	290.9	328.6:	297.4
S.D.	:	1261.8	1686.9	2887.2	1369.3	1626.1	1928.3:	1974.4
6-10	:							
Mean	:	167.6	158.6	165.9	177.7	163.7	169.5:	169.3
S.D.	:	611.1	741.0	1513.1	1194.7	800.7	1082.4:	1128.9
11-15	:							
Mean	:	159.1	245.0	206.7	197.4	172.0	192.6:	194.8
S.D.	:	439.3	2170.0	1640.3	1810.7	634.6	1032.5:	1328.8
16-20	:							
Mean	:	388.8	371.0	440.9	445.4	395.2	456.7:	440.3
S.D.	:	1027.3	1065.1	1664.5	1765.6	1141.8	1484.1:	1502.1
-----+-----								
Race	:							

White	:							
Mean	:	286.8	338.5	366.1	312.7	289.4	349.5:	325.9
S.D.	:	1191.7	1834.3	2838.5	1701.2	1250.7	1683.8:	1824.6
Nonwhite	:							
Mean	:	236.9	305.1	300.9	271.6	302.6	316.6:	308.2
S.D.	:	1091.2	3258.5	2198.5	2052.2	1513.0	1636.7:	1852.1
-----+-----								
Sex	:							

Male	:							
Mean	:	256.2	331.8	300.8	275.4	276.6	294.7:	290.9
S.D.	:	1142.4	3349.6	2349.2	1906.0	1518.2	1759.3:	1950.8
Female	:							
Mean	:	303.1	310.2	343.6	321.9	313.7	348.5:	336.5
S.D.	:	1212.9	1806.2	2514.5	1735.8	1264.1	1534.1:	1736.6
-----+-----								
Total	:							

Mean	:	280.8	320.9	323.3	299.8	296.1	322.8:	314.7
S.D.	:	1180.1	2681.6	2437.7	1818.8	1390.3	1645.7:	1842.0
-----+-----								

APPENDIX B (continued)

Further explanation of the contents
of fields in the several Summary
System Forms.

LB Form

- 1) CASE-NUMBER
- 2) B YEAR This entry not changed even if not the same as DOB in Eligibility record.
- 3) TIE 0-8, tie breaker if several kids in family.
- 4) FORM-COUNT XXX no. of last record in that group.
- 5) OFFICE-MD No. of MD office visits.
 (9) Batch No. field 1 = office visit,
 P = Hospital visit, 5 = Inpatient, 6 =
 Hospital OPD.
- 6) C\$ OFFICE-MD Charges for all office visits to MD.
- 7) P\$ OFFICE-MD Payments for office visits to MD.
- 8) OPD-MD OPD visits only where an MD made a charge
 for his services!
 Not total OPD visits.
- 17) ADMISSIONS Total admissions for 12 months.
- 18) DAYS-INPT Total no. of days for inpatient care, total
 days hospitalized;
- 19) C\$ DAYS-INPT Charges for all days of care including only
 room charge; Service type = 5, Batch No. = 5.
- 21) VOPD Total no. of OPD visits.
- 22) C\$VOPD Charges for all OPD visits and may also
 include professional fees.
- 24) VER Total visits to ER (JHH included ER visits
 with OPD but if charge was greater than \$65
 at JHH was considered to be an ER visit).
- 27) NOPD No. of different OPD's used.
- 28) NINPT No. of different hospitals used for
 admissions.
- 29) NER No. of different ERs used.

LC FORM

- 1) through -3) as before.
- 4) SERVICE RECORDS No. in the 12 month period.
- 5) PED No. visits to a Pediatrician, only office visits and not inpatient.
- 8) EPSDT-Office Office visits for EPSDT services; 90759 = initial visit; 90769 = periodic less than 2 years, 90779 = periodic greater than 2 years.
- 9) C\$EPSDT Charges for all services at EPSDT visit.
- 11) HEALTH OFFICE Health Supervision Visits, Code 01 to office physician.
- 12) C\$HEALTH-OFFICE Charges for all services at Health Supervision visit.
- 14) URI-ER URI's appearing as first DX in ER, only first DX looked at.
- 20) VER Total of all ER visits whether charged as facility or professional fee or both. More reliable than #29 "NER" in LB.
- 21) C\$VER Charges for ER visits including both facility and professional fees.
- 23) VCLinic No. of visits to OPD measured by professional fee or facility charge or service record.
- 24) C\$VCLinic Charges for all clinic visits whether facility and/or professional fees.
- 26) C\$OPD Additional charges connected with clinic visits not included above, mainly lab charges.
- 28) INPT No. of inpatient services or admissions - probably more reliable than #28 "NINPT" in LB; Use #17 in LB.
- 29) C\$INPT Total of all inpatient charges including daily rate, professional fees, lab etc.

LD Form

- | | |
|------------------------|--|
| 4) Pharmacy
Records | Total no. of records for pharmacy which = no.
of medications. |
| 8) Audiology | No. of tests done. |
| 11) Laboratory | Speciality code of 33 and count of no. of
services - probably free-standing labs.
Generally appeared as separate charge, not
connected to other services. |
| 14) Other | All other Speciality Codes - 24, 26, 30,
31, 32, 34, 35, 37, 40, 42, 43 |
| 17) Optometry | Service codes 25, 30 and Service type 8,
Service record code 6. |
| 20) Dentist | No. of all dental visits. |
| 21) C\$Dentist | Total of all dental charges. |
| 23) Prev-Dentist | Dental visits with prophy indicated. |
| 26) Acute-Dentist | Dental visits for all other services
excluding prophy - includes restorations,
acute, etc. |
| 29) NDentists | No. of different dentists or groups attended
(Group may have single vendor no.) |
| 30) NPrev-Dentist | No. of different dentists providing
prophylactic care. |

LE FORM

(Dx enumerated for both inpatient and outpatient care

- | | |
|-------------------------------|--------------------------|
| 5) TB Includes 4 and 5 codes. | |
| 14) Metabolic Dis | Includes codes 17 and 20 |

LF Form

- | | | | |
|-----|-----------------|----------|----------------|
| 15) | Genitourinary | Includes | 70, 75, 77, 79 |
| 17) | Abortion | " | 80, 82 |
| 18) | Delivery | " | 83, 84 |
| 22) | Musculoskeletal | " | 89, 90 |

LG Form

-1 -3) as above:

- | | | |
|-----|---------------|---|
| -4) | Base Records | One per invoice but may be linked with as many as 20 increments or service records per visit. |
| 5) | Off-EPSDT | No. of initial office visits for EPSDT screen. |
| 6) | <2-Off-EPSDT | Periodic visit for EPSDT for pt. < 2 years. |
| 7) | >2-Off-EPSDT | Periodic visits for those > 2 years of age. |
| 8) | Physical-Ther | Speciality Code = 27 or Service Type = 8 +
Service Code = 5 or
Service Type 5 + Batch no. 6
+ Service Code 29 |
| 11) | Asthma | Any Dx of 51 + Therapeutic Index 1940; Dx located anywhere in Dx fields; Includes both Inpatient and Outpatient; |
| 12) | NO-ER-Asthma | No. of non-ER visits for asthma. To make diagnosis all Dx's must have code and Therapeutic Index. |
| 13) | ER-Asthma | No. of ER visits for Asthma |
| 14) | Otitis | No. of eposides of Otitis; i.e., Otitis visits separated by at least 28 days. Dx Code 34 includes other ENT conditions also. Dx's in (15) and (16) counted similarly. |
| 15) | No-Otitis-Aud | No. of visits with both Audiometry done but Otitis at 2 or fewer episodes; |

- LG FORM (continued)
- 16) Audiom-Otitis No. of visits with both
3 or more episodes of Otitis and audiometry
done;
 - 17) URI Ambulatory visits for URI and only Dx1 looked
at.
 - 18) Antibiotics-
URI No. of visits for URI AT which antibiotics
were given, Therapeutic Index 0346-0388.
 - 19) Insulin No. of Insulin Rxs charged for.
 - 20) Tetracycline Therapeutic Index 0350
 - 22) Rheumatic-F/H No. of ambulatory visits for RF.
 - 23) Penicillin-
Rheu No. of visits where RF and Pen appear.
 - 24) Choramphen-
URI No. of visits where both indicated within 5
days of each other.
 - 25) Pneu-Chlormph No. of visits with Dx 46 + T.I. 0351
(Therapeutic Index)

LH Form (Before and After)

- 5) B Office No. of office visits during before period;
i.e., 1/1/80 - 6/30/80.
- 8) BOPD OPD visits during "before" period.
- 11) BER Visits to ER during "before" period.
- 14) B Total All services during "before" period including
visits, admissions, speciality clinic visits,
etc.
- 15) C\$BTotal Total charges for 6 months.
- 17) A Office No. of office visits during "after" period.

LI Form

(B=Before) 6 months

- 5) B Admissions No. of admissions during "before" period.
- 6) B Days Days of hospitalization during 1/1/80-6/30/80.
- 7) B Ambulatory No. of ambulatory visits during "before" period.
- 10) B Pediatricians No. of office visits to Peds.
- 13) B Type-UPC USUAL provider, Prvt. MD, OPD, ER, mixed (no mode) determined by mode of total no. of ambulatory visits.
- 14) B% Type-UPC % of ambulatory visits to usual provider during "before" period by Provider Type.
- 15) BUPC % of ambulatory visits to usual provider (identified by Vendor no.)

Form LJ

- 4) Care-Non-JHH A C and Y patient who received care outside of JHH C and Y.
"Yes" = 1 or "No" = 0
- 5) Clinic-JHH No. of clinic visits to JHH clinics other than C and Y.
- 8) C and Y Visits to JHH C and Y clinic.
- 11) ER-JHH No. of visits to JHH ER by C and Y pts.
(C and Y patients are those who during year made any visits to vendor #106 = JHH C and Y clinic)
- 14) Adm-JHH C and Y pt. admissions to JHH.
- 21) Asthma-JHH Has Dx of asthma Yes or No.
- 22) No-ER-Asthma No ER visits for asthma.
- 23) ER-Asthma No. of ER visits for asthma (21-23 asthma Dx may be in D1, D2, D3 or D4).
- 24) URI-ER No. of ER visits where URI was Dx 1.
- 25) C\$Total-JHH Total charges for all JHH services including C and Y.

FORM LJ (continued)

- 27) Prescriptions No. of prescriptions.
- 29) C\$Grand-Total All charges for services at JHH and other clinics and prescriptions.

Form LK

- 4) Form Count Data for C and Y population
Last record no. for this patient.
- 5) X Office-Visits Office visits outside of JHH C and Y.
- 8) X Clinic-Visits Clinic visits to other sites outside of JHH C and Y or JHH clinics.
- 11) X ER-Visits ER visits to other than JHH ER.
- 14) X Admissions Admissions to hospitals other than JHH.
- 16) C\$X Days All charges for hospital care outside JHH.
- 18) X Dental Dental visits outside of JHH C and Y dental clinics.
- 21) X No-ER-Asthma Non-ER outside visits for asthma.
- 22) X ER-Asthma Outside ER visits for asthma.
- 26) Asthma "Yes" or "No" for asthma whether at JHH or outside.
- 27) Prescriptions Total of all prescriptions.
- 29) C\$Grand-Total All charges for care at JHH and outside.

Form LL

- | | | |
|-----|-----------------|---|
| -4) | Type-UPC | Provider type for plurality of visits (non speciality) i.e., Private MD-OPD-ER-Mixed. |
| 5) | Prop-Type-UPC | Proportion of visits made to the UPC noted in (4). |
| 6) | UPC | % of visits noted in (4) to UPC by vendor no. |
| 7) | SECON | Consecutive visits to same provider 0-1.00. |
| 8) | Primary-SECON | Visits to specialists removed in calculation. |
| 9) | Generalists | No. of visits to non-specialists; i.e., GP, FP, Peds, Internists. |
| 10) | % Generalist | % of visits to non-specialists. |
| 11) | Non-Generalist | Visits to all others. |
| 13) | MD-Services | No. of MD professional services. |
| 16) | Ambulatory | No. of ambulatory visits MD + OPD + ER. |
| 19) | Special-Serv | Service type 8 only criterion for this count. |
| 22) | Total-Services | Total no. of all services. |
| 23) | C\$Total-Serv | Charges for all services except prescriptions. |
| 25) | Prescriptions | No. of all Rx's. |
| 27) | Grand-Total | All services provided including Rx's. |
| 30) | Facilities-Ambu | No. of different offices OPDs and ERs used based on count of vendor numbers. |

(Some professional groups may have had only one vendor no. Other groups, however, may have used individual vendor nos. even though working in a group.)

APPENDIX C

Contents of MMIS Payments Records Including
Base, Service and Pharmacy Formats.

Payment Records in MMIS

Base Record

<u>Position #</u>	<u>Variable</u>	<u>Field Head</u>	
1,2	County		00 Budget Adjustment
3-8	Case Number	CASE-NUMBER	
9-10	Birth Year	BYEAR	
11	Tie Breaker Form	TIE FORM	
12-13	Speciality Codes	SPEC CODE	1 General Practice 2 Family Practice 3 Anesthesiology 4 Colon & Rectal Surgery 5 Dermatology 6 Internal Medicine 7 Neurosurgery 8 OB/GYN 9 Ophthalmology 10 Orthopaedic Surgery 11 Otolaryngology 12 Pathology 13 Pediatrics 14 Plastic Surgery 15 Physical Medicine and Rehabilitation 16 Neurology and Psychiatry 17 Preventive Medicine 18 Radiology 19 Surgery 20 Thoracic Surgery 21 Urology 22 Dentists 23 Pharmacy 24 Ambulance Wheel Chair Van 25 Optometry-Vision Care 26 Podiatry 27 Physical Therapy 28 Hospital 29 Home Health 30 Durable Medical Equipment

			31	Personal Care Managers
			32	Personal Care Worker
			33	Laboratories
			34	CC Providers exclusive (non MD, non hospital)
			35	Adult Day Care
			36	Contract Clinic (STI)
			37	Emergency Medicine
			38	N.H. payable through Medicare
			39	Chronic Hospitals
			40	N.H. in Hospitals
			41	Hearing Aids and Audiological Services
			42	Oxygen Suppliers
			43	Nurse-Midwives
14	Service Type	SERVICE TYPE	1	MD Services
			2	Pharmacy
			3	Home Health
			4	Dental
			5	Hospital
			8	Special
15-19	Vendor Number	VENDOR NO.		
20-24	Hospital Code	STATUS		<p>If service type = 1 and service performed in hospital, = provider number of hospital</p> <p>If Service Type = 1 and service provided in office or home, = blank</p> <p>If Service Type = 2, = provider number of MD prescribing drug, <u>or</u></p> <p>OH+hospital number (out-patients)</p> <p>NH+nursing home number</p> <p>OA+ ?</p>

89999 - no prescribing
MD

If Service Type = 5,
generally will be blank.
Disregard any numbers.

25-35	Vendor Identification Information	PATIENT ID	Optional patient identification number assigned by hospital or vendor.
36	Batch number	BATCH	Same as Service Type (Position 14) <u>except:</u> 1 - Home or office visit (MD) P - Hospital Visit (Inpatient or outpatient) by MD 5 - Inpatient 6 - Outpatient
68	Race	RACE	1 - White 2 - Negro 3 - American Indian 4 - Unknown 5 - Old Cuban Refugee 6 - Indo-Chinese Refugee 7 - New Cuban Refugee 8 - Cuban/Haitian Refugee 9 - All other Refugee
69	Sex	SEX	1 - Male 2 - Female
70-71	Year of Birth	YBIRTH	
72, 73	Medical Assistance Category	CTEGRY	Transferred from eligibility record
74	Institution	INSTITUTION	Transferred from eligibility record
76-81	Service Start (Year/Month/Day)	STAR-DATE	If hospital service, indicates admission and discharge dates. If ambulatory care indicates first and last dates of service during month or longer period.
82-87	Service End Date (Year/Month/Day)	END-DATE	

88-95 Diagnoses D1
(Up to four may D2
be listed) D3
D4

01 Health Supervision
Including normal
and newborn care,
immunization, and
screening

Infective and Parasitic
Diseases

04 Tuberculosis, pul-
monary and other
respiratory
05 Tuberculosis, other
06 Syphilis and other
venereal diseases
08 Other infective and
parasitic diseases

Neoplasms

09 Malignant neoplasms
12 Neoplasms of
lymphatic and blood-
forming tissue
13 Benign neoplasm
14 Neoplasm of
unspecified nature

Endocrine, Nutritional
and Metabolic Diseases

16 Diabetes Mellitus
17 Diseases of other
endocrine glands
18 Malnutrition,
avitaminoses, and
other nutritional
deficiency states
20 Other metabolic
diseases
24 Disease of the Blood
and Blood-forming
Organs

Mental Disorders and
Mental Retardation

26 Mental Retardation
28 Other mental,
psychoneurotic and
personality
disorders
29 Alcoholism
30 Drug Dependence

Diseases of the Nervous
System and Sense Organs

- 31 Diseases of the CNS,
n e r v e s a n d
peripheral ganglia
- 33 Diseases of the eye
- 34 Diseases of the ear
and mastoid process

Diseases of the
Circulatory System

- 36 Rheumatic Fever and
rheumatic heart
disease
- 37 Hypertensive Disease
- 38 Acute myocardial
Infarction
- 40 Other forms of heart
disease
- 41 Cerebrovascular
Disease
- 42 Diseases of the
arteries, veins, and
other diseases of
the circulatory
system

Disease of the
Respiratory System
(Except TB and
neoplasms)

- 44 Acute Upper
Respiratory
Infections
- 46 Pneumonia and
Bronchitis
- 48 Hypertrophy of
tonsils and adenoids
- 51 Influenza,
emphysema, asthma,
and other diseases
of the respiratory
system

Diseases of the
Digestive System

- 54 Diseases of the
teeth and supporting
structures
- 55 Peptic Ulcer
- 57 Other diseases of
upper G.I. tract
- 58 Appendicitis

- 59 Hernia of abdominal cavity
- 62 Other diseases of the intestine and peritoneum
- 63 Cholelithiasis and Cholecystitis
- 66 Other diseases of the liver, gall-bladder and pancreas

Diseases of the Genitourinary System
(Except neoplasms and venereal diseases)

- 70 Diseases of the Urinary System
- 75 Diseases of the male genital organs
- 77 Diseases of the breast, male and female
- 79 Diseases of the female genital organs

Pregnancy, Delivery and the Puerperium

- 80 Complications of Pregnancy
- 81 Abortion - Therapeutic/Legal
- 82 Abortion - All Other
- 83 Delivery, uncomplicated
- 84 Delivery, complicated
- 85 Complications of the Puerperium
- 86 Normal Pregnancy, not delivered
- 87 Diseases of the Skin and Subcutaneous Tissue
(Except Venereal Diseases)

Diseases of the Musculo-skeletal System and Connective Tissue

- 89 Arthritis and rheumatism (except rheumatic fever)

- 90 Osteomyelitis and other disease of the bone, joint, connective tissue and musculoskeletal system
- 91 Congenital Anomalies including Congenital Heart
- 92 Immaturity, Pre-maturity Dysmaturity
- 93 Birth injury, hemolytic disease of newborn and other conditions
- 94 Symptoms and Ill-defined Conditions

Injuries, Poisonings, Violence and Adverse Effects

- 95 Fractures
- 96 Burns
- 97 Other injuries due to accidents or violence
- 98 Poisonings and adverse effects

96 Type of Service TYPE
 SERVICE

- I MD in hospital or inpatient hospital bill
- O MD in OPD or outpatient hospital bill
- E MD in ER or ER bill
- P Podiatry
- V Vision
- D Durable medical equipment
- N Other vision services
- A Ambulance and Wheelchair Van
- T Physical Therapy
- C Other special services

141-144 Total Cost or Charge
 (7 digits
 packed into 4)

TOT-COST

If Service Type 2
(Pharmacy = total drug
cost for all medications
on invoice)

		If other Service Types = provider total charges on invoice
145-148 Pharmacy Fee Collections	PHAR-FEE	If Service Type 2 and (Pharmacy) = pharmacist's fee
		If other Service Type = collections from other 3rd party payors, total amount.
149-152 Total amount paid by Medicaid	PAY- MEDICAID	If Service Type 2 (Pharmacy) = total drug cost (141-144) + pharmacist's fee (145-148) - Copayment (usually \$.50)
		If Other Service Type = sum of computed amounts from "Increments" minus collections (145-148)
174,175 Increment Count	INCREMENTS	Number of services provided (01-35)

Services Other than Pharmacy in MMIS

<u>Position #</u>	<u>Variable</u>	<u>Field Head</u>	<u>Code or Explanation</u>
1	Service Type	SERVICE TYPE	1 MD Services 3 Home Health 4 Dental 5 Hospital 8 Special Services
27-32	Service Date	DATE-SERV	If Inpatient Service , = discharge date If Dental Service, = last date on invoice If MD Service, = date of last service
33-34	Procedure Modifier for MD Service (began using during 1980)	MODIFY PROC	22 Unusual Services 23 Unusual Anesthesia 26 Professional component 30 Anesthesia Service 47 Anesthesia by Surgeon 50 Multiple or Bilateral Procedures 52 Reduced Services 54 Surgical Care Only 55 Postoperative Management Only 56 Preoperative Management Only 66 Surgical Team 75 Concurrent care, services rendered by physician 76 Repeat Procedure by same physician 77 Repeat Procedure by another physician 80 Assistant Surgeon 81 Minimum Assistant Surgeon 90 Reference (Outside) Laboratory 99 Multiple Modifiers

39-40	Number of days or services (3 digits packed into 2)	DAYS SERVICE	<p>If Inpatient, = number of days of hospitalization</p> <p>If not Inpatient, = number of services per day</p>
41-45	Procedure Code	PROCEDURE COD	<p>MD Services = codes from CPT No. 4 Injectable Drugs (>6/80 only):</p> <p>D0800 Anti-infective Agents</p> <p>D0400 Antihistamine Drug</p> <p>D1000 Antineoplastic Agents</p> <p>D1200 Autonomic Drugs</p> <p>D2400 Cardiovascular Drugs</p> <p>D2800 CNS Drugs</p> <p>D4000 Electrolytic, Caloric and Water Balance</p> <p>D5600 Gastrointestinal Drugs</p> <p>D6800 Hormones and Synthetic Substitutes</p> <p>D8000 Serums, toxoids and vaccines</p> <p>D8800 Vitamins</p> <p>D9900 Miscellaneous</p> <p>D9999 Unclassified</p> <p>Special Services Codes >12/27/80 only. Other Service Types = Blank</p>
46-47	Service Code	SERVICE CODE	(See Appendix)
48-51	Vendor Charge (7 digits packed into 4)	CHA-VEND	Usual and customary fees
52-55	Amount paid to vendor by Medicaid (Packed Field)	PAY-VEND	Also appears in base record (149-152)

Pharmacy Record in MMIS

<u>Position #</u>	<u>Variable</u>	<u>Field Head</u>	<u>Code or Explanation</u>
1	Increment Code (Service Code)		2 (Pharmacy)
10-18	National Drug Code		
	10-14 Manu- facturer	MANUFACTURER	
	15-18 Product Code	PRODUCT	
21-26	Date Prescrip- tion Written (Year/Month/Day)	WRIT-DATE	
27-32	Date Prescrip- tion Filled (Year/Month/Day)	FILL-DATE	
33-34	Days of Supply (3 digits packed into 2)	DAYS SUPPLIED	
35-39	Quantity Dispensed	QUANTITY	
44-47	Drug Cost (7 digits packed into 4)		
48-51	Total amount paid to pharmacist (7 digits packed into 4)	TOT PAID	

Fields Added to Pharmacy Increment

Therapeutic Categories	RX1
	RX2
	RX3
	RX4

APPENDIX D

The Utilization of Medical Services by
Children with Asthma in Two Different Medical
Care Settings.

APPENDIX D

The Utilization of Medical Services by Children with Asthma in Two Medical Care Settings.

Robert H. Drachman, M.D., and Harvey Katz, M.D.

Asthma is one of the more common chronic diseases of childhood. It accounts for a very significant amount of illness and absenteeism from school. Asthma is also a very costly illness for both parents and third party payors. Periodic episodes of respiratory distress account for frequent physician contacts both in the office setting and in the hospital emergency room as well as numerous inpatient admissions when wheezing cannot be controlled in other settings. Consequently, asthma has a very significant impact on the health and development of children as well as their general well being.

Asthma is a disease of the small airways of the lung. It is characterized by reversible airway narrowing often accompanied by infection and excessive production of mucous in these same areas. A vicious cycle, often with infection, of muscular narrowing, mucous plugging, and further persistent narrowing with frank obstruction to expiration of air from the alveoli may progress to a resistant form of the disease called status asthmaticus. Inpatient admission and continuous and respiratory intravenous therapy may be required to arrest the progress of respiratory distress at this stage of the disease.

The causes of asthma are multi-faceted and the interplay of infection, pathophysiology and environmental factors may conspire to precipitate the acute disease. The small airway musculature may be stimulated to contract in response to infection and/or adverse respiratory irritants. Allergic hypersensitivity may also produce the same result. Adverse environmental factors such as cold air, airborne particles, and irritating chemical vapors may all cause muscle contraction and excessive production of mucous as will respiratory infections. Psychosocial factors have also been implicated in the various manifestations of the disease.

In the majority of children with asthma, the disease can be controlled quite successfully by means of various therapeutic interventions. Medications are available which before the fact prevent constriction of the airway musculature and the resultant acute episode of asthmatic

wheezing. However, great variability exists in the degree of control observed among various groups of patients.

Some children with asthma respond to medication in an unpredictable or erratic fashion for uncertain reasons. This problem appears to be more common in children of lower socioeconomic groups. They may fail to take recommended medications or suggestions for environmental control measures in the home to reduce allergens or irritants which may initiate wheezing may not be carried out. An implicated pet or feather pillow or dust catching rugs or curtains may not be removed from the child's environment despite specific recommendations. This failure or inability to carry out recommended treatment stems from many causes. Low income parents may be overwhelmed with the day to day demands of living which interfere with the implementation of complex instructions. Other stresses or lack of resources may also prevent compliance with recommendations.

In the current study the utilization of medical services is compared for a group of asthmatic children in a prepaid health care plan with those in a Medicaid population registered in a comprehensive health care program. An attempt is made to establish the comparability of severity of asthma in the two populations and then measure the use of medical resources. Adverse outcomes are represented by greater use of the emergency room and increased rates of hospitalization. Both impair normal childhood activities as well as generating considerable costs for all involved. Consequently, the severity of illness and concomitant lost days of school or workloss by parents are indirect measures of medical care outcomes. Furthermore, the measures of medical care utilization are readily available since such data resides in many administrative medical information systems which lend themselves to ready analysis. These measures serve as useful proxy yardsticks of the adequacy of care assuming that fewer emergency room visits and less hospitalizations are preferred.

Methods

The study population designated as medical plan are children who were members of a prepaid health care plan, (the Columbia Medical Plan), in a middle class area of a suburban county. Medical care was provided in an attractive structure located in a large residential development. Adults were served in other areas of the medical plan program. All ambulatory visits for care required a modest co-payment. Medical care for children was provided by board-certified pediatricians, usually with

several years of practice experience. Evening and weekend emergency care was provided in a nearby facility and was under the supervision of the regular pediatric staff. Indeed the primary care provider for the particular child visiting the urgent care center would be consulted when acute care for an asthmatic attack was required. Families in this practice were generally highly compliant and quite cooperative when following through with recommended therapeutic interventions.

The sample of children examined from the Medical Plan were those who during a twelve month period made at least one visit because of a problem with asthma. An automated summary medical information system was searched for these children and data prepared from this automated file. A twenty percent sample of records was verified against the paper medical record in order to assure completeness of recording.

The study group designated as hospital clinic included both Medicaid and non-Medicaid patients and was drawn from a large population enrolled in a Title V, Children and Youth (C&Y) Project at a large inner city hospital, (the Johns Hopkins Hospital), in Baltimore, Maryland. Sixty-five percent were Medicaid eligible and most of the others were medically indigent. About 18,000 children were enrolled in the C&Y Clinic and 98 percent were black.

Services for the C&Y population were provided in an area contiguous with the hospital and included acute and chronic illness care as well as routine preventive services and emergency care. Medicaid patients paid no fees while self-pay patients were charged on a sliding fee scale. However, no self-pay patients were ever turned away even if unable to pay the calculated fee. The clinic was staffed by board-certified pediatricians and functioned five days a week. After hours emergency care was provided in a nearby emergency room. Visits for asthma were counted regardless of which facility the patient visited. Pediatric emergency room care was provided by pediatric residents who rarely were familiar with the C&Y patients. Decisions about hospital admission were made principally by third-year resident staff who on occasion may have consulted with the assigned pediatrician from the C&Y clinic.

Data for the C&Y population were entered into a medical information system called the Children's Automated Retrieval and Entry System (the CARE System). Clinic visits, emergency care, and hospitalizations were all included in this system. Visit files were searched for July 1, 1981, through June 30, 1982, for children with an

acute visit for asthma who at the time of the visit were aged 1 year through 12 years, a grouping which corresponded to the medical plan study population. During this study period 14 percent (2,176) of the 15,161 visits to the pediatric emergency room were for asthma which represented 10.3 percent of the total number of individual patients seen during the 12 month period. All data were tabulated on the CARE System.

Results

In the first portion of the study, the comparability of Medical Plan and hospital clinic populations was investigated. In Table 1 the age distribution of asthmatic patients is compared for the Medical Plan and Clinic populations. The data presented in Table 1 are for children who presented with at least one episode of acute asthma during the 12 month study period. In the Medical Plan population, 4.8 percent (124 patients) of the total population of children were identified as asthmatics. Of the Medicaid population, 6.5 percent or 279 children were asthmatics and there were twice as many children in the 1-4 year old age group compared to the Medical Plan population. These proportions were roughly comparable to the age distributions in the general program populations.

In Table 2 patients are grouped into utilization subpopulations based on the number of acute visits for asthma made during the study year. Conceptually, these correspond to severity groupings although no corroborating objective physiologic measures of severity were available. It is striking in Table 2 that the distribution of patients into "severity" groupings is identical for the Medical Plan and for the Medicaid populations. Half of the patients made only one visit. About one-third made two to four visits, and 14 percent made 5 or more visits during the 12 month study period. Consequently, the 2 populations appear quite similar in regard to the proportion of patients in the 3 proxy "severity" groupings.

The average number of visits for acute asthmatic episodes was also quite similar in the 2 populations as seen in Table 3. However, there is a trend towards more acute visits in the Medicaid population. In the 2-4 visit group, Medical plan patients made an average of 2.6 acute visits as did Medicaid patients. In the 5+ visit group medical plan patients made an average of 8.5 visits compared with 9.6 visits in the Medicaid population. Again, the population similarities are fairly apparent.

The tabulation of emergency room visits in Tables 4A and 4B represent visits for acute asthma outside of regular

office hours. In Table 4B it is apparent that a higher proportion of the Medicaid population made use of the emergency room compared to the Medical Plan patients. Average number of visits to the emergency room for the Medicaid population is also significantly greater than for the Medical Plan. By Visit Group the average number of ER visits was 0.6, 1.5, and 6.7 for Medicaid patients and 0.2, 1.1, and 3.7 for Medical Plan children.

In Table 5 the number and rate of hospitalizations for asthma are given for the several populations. During the 12 month study period there were no hospitalizations for asthma among Medical Plan patients. However, when medical plan charts were reviewed it was noted that 2 hospitalizations had occurred among this population during the 12 month period following the study. Among Medicaid asthma patients there were 73 admissions for an over-all hospitalization rate of 26.2 per hundred Medicaid asthma patients. This ranged from a rate of 4.3 for the one visit group through 22.2 for the 2-4 visit group, to 109.8 for the 5+ visit group. A summary of comparative measures is given in Table 6. Major differences between the several populations occurred in the emergency room visits and the inpatient admissions for asthma. It is hypothesized that the somewhat lower figures for the non-Medicaid hospital clinic population stems from the obstacles placed in their way by the requirement to pay fees, (even adjusted fees) for their children's medical care.

Discussion

The most striking findings in this study are in the comparison between Medical Plan children and those under Medicaid in regard to their use of the emergency room and their hospitalization experience. These comparisons are made under the unproven assumption that the "Asthma Visit Group" subpopulations identify groups with similar severity of asthma. Among the Medicaid population a much higher percentage used the emergency room during the study year and made more visits to that site of care than medical plan children (Table 6), particularly when examined by "Visit Group". However, among both groups of 5+ visits, all patients made use of the emergency room for acute care during episodes of asthmatic wheezing. In addition, hospitalization experience is a prominent feature of the difference between these two populations in that during the study year no hospitalizations occurred among the Medical Plan group while the overall admission rate among Medicaid children was 26.2 per hundred patients. These differences obviously have major implications for the well being of patients and the cost of care.

No data assembled in the course of this study explains the differences in illness and patient behavior and only speculation is possible. Specified in the study design but not corroborated by any objective physiological measures is the assumption that the number of acute wheezing episodes requiring medical attention during the course of a year is a rough indicator of the severity of illness. If, indeed, this hypothesis is correct, then the subsequent observations regarding emergency room use and inpatient admission is presumed to be a function of the care provided by both caretakers and providers or some other confounding factor. Concomitant infection may be more severe in the low income group than the other, for example. There is also some evidence that complex environmental control measures and consistent medication administration may not be followed through in low income families. The reasons for noncompliance are many but include a lack of clarity about the need for medication and the regimen to be followed as well as many obstacles imposed by impediments inherent in inadequate housing, limited income, single parent households, and perceptions of the illness having to do with severity and susceptibility and the ease of taking therapeutic measures. Admittedly the multiplicity of medications and the indications for each represent taxing demands on parents. In addition, the complexity of environmental control measures and their cost may well pose serious obstacles to follow through on medical recommendations for the asthmatic child, particularly for low income Medicaid families.

However, it is also possible that the disease is more severe in low income children who for various pathophysiologic reasons respond adversely to respiratory infections and allergens or irritants as well as manifesting more severe symptoms due perhaps to greater musculature contraction and exudation of mucous in small airways. Superimposed or initiating infection may also be more common and more severe. Nothing in the current study provided an opportunity for measuring physiological differences between patients in an objective fashion. The current data raise many questions about middle class Medical Plan children and low income Medicaid children with asthma which deserve to be pursued in a more quantitative fashion because of the grave significance of this illness for the children involved.

If one accepts the supposition that low income Medicaid families have more difficulty in complying with medical recommendations regarding the therapy for asthma, then certain changes in the approach to formulating and implementing medical care plans seems indicated. If

compliance with medical recommendations is more adequate among the Medical Plan population, then efforts should be made to assure that Medicaid families receive instruction, assistance, encouragement, and concrete case management and family support services to allow them to more completely emulate that population regarding the provision of home care.

In dealing with other chronic illnesses of children, such assistance has been provided by specially trained home visitors who understand the basic principles of the disease and are committed to assisting the family in more adequately providing care. Indeed, if the medical care problems among low income families prove to be those connected with compliance, the Medicaid program would do well to provide additional funding to test the value of home visiting case managers. They would be charged with using multiple techniques to assist and encourage families to assume greater responsibility for implementing asthma care recommendations in the home. However, they must guard against replacing parents in these tasks. Not only would payments for asthma care be less if emergency room and inpatient admissions were reduced but the children with asthma would greatly benefit by decreasing absenteeism from school and assuring more normal daily activities. This assumption suggests that payment for medical services is only one part of the service plan that needs to be provided for children in low income families. In addition to medical care it may be necessary to provide home based family support services in order to make certain that medical recommendations are followed through and other therapeutic measures are adhered to. These hypotheses deserve further study in subsequent explorations of the problem in the future.

Table 1. Children with Asthma who made
at least One Acute Asthma
Visit during 12-Month Period.

Medical Plan				Hospital Clinic			
				Medicaid	Non-Medicaid		
Age Group	Asthma No. Pts.	(%)	% in Plan Pop.(1)	Asthma No. Pts.	(%)	Asthma No. Pts.	% in Clinic Pop.(2)
1-4 Yrs.	36	(29)	25%	154	(55)	62	(35)
5-9 "	57	(46)	46	90	(32)	88	(50)
10-12 "	31	(25)	28	30	(13)	25	(14)
	<u>124</u>			<u>279</u>		<u>175</u>	

(1) Prepaid Medical Plan population aged 1-12 years = 2,591

(2) Hospital Clinic population aged 1-12 years = 6,690

Note: Clinic population numbers are those who appeared in
clinic for care during the 12-month study period.

Table 2. Asthma Visit Groups. Number of Patients who Made at Least One Visit during 12-Month Period.

Number of Acute Visits for Asthma	Asthma No. Pts. (%)	Medical Plan	Hospital Clinic	
			Medicaid	Non-Medicaid
		Asthma No. Pts. (%)	Asthma No. Pts. (%)	Asthma No. Pts. (%)
1	62 (50)	139 (50)	115 (66)	
2-4	45 (36)	99 (35)	46 (26)	
5+	17 (14)	41 (15)	14 (8)	
	124	279	175	

Table 3. Total Visits and Visits Per Patient for Acute Asthma During 12-Month Period.

Medical Plan				Hospital Clinic					
Asthma Visit Group				Medicaid			Non-Medicaid		
	No. Pts.	Asthma Visits	Avg. Visits	No. Pts.	Asthma Visits	Avg. Visits	No. Pts.	Asthma Visits	Avg. Visits
1	62	62	1.0	139	139	1.0	115	115	1.0
2-4	45	117	2.6	99	254	2.6	46	117	2.5
5+	17	144	8.5	41	392	9.6	14	170 ⁽¹⁾	12.1
	124	323	2.6	279	785	2.8	175	402	2.3

(1) Includes one child with 61 visits during the 12-month period. If excluded the average number of visits for this group would be 8.4.

Table 4a. Medical Plan Emergency Room
Visits for Acute Asthma
During 12-Month Period.

Asthma Visit Group	Total Pts.in Group	Medical Plan ER Visits			
		Pts.	(%)	Visits	Avg. Visits
1	62	15	(24)	15	0.2
2-4	45	30	(67)	48	1.1
5+	17	17	(100)	63	3.7
	<u>124</u>	<u>62</u>	<u>(50)</u>	<u>126</u>	<u>1.0</u>

Table 4b. Emergency Room Visits for Acute Asthma
during 12-Month Period for Medicaid and
Non-Medicaid Patients in Hospital Clinic.

Medicaid ER Visits						Non-Medicaid ER Visits				
Asthma Visit Group	Total Pts.in Group	Pts.	(%)	Visits	Avg. Visits	Total Pts.in Group	Pts.	(%)	Visits	Avg. Visits
1	139	83	(60)	83	0.6	115	67	(58)	67	0.6
2-4	99	84	(85)	145	1.5	46	39	(85)	65	1.4
5+	41	41	(100)	273	6.7	14	14	(100)	126 ⁽¹⁾	9.0
	279	208	(75)	501	1.8	175	120	(69)	258	1.5

(1) Includes one child with 49 visits to the emergency room during the 12-month period. If excluded the average number of visits for this group would be 5.9.

Table 5. Hospitalizations for Asthma for Children making at Least One Visit for Acute Asthma during 12-Month Period.

Medical Plan				Hospital Clinic							
				Medicaid				Non-Medicaid			
Asthma Visit Group	Pts.(1) in Group	No. of Adms.	Adm. Rate	Pts. in Group	Pts.(2) Adm.	No. (3) of Adms.	Adm.(4) Rate	Pts. in Group	Pts.(2) Adm.	No. of Adms.	(4) Adm. Rate
1	62	0	-	139	6	6	4.3	115	7	7	6.1
2-4	45	0	-	99	18	22	22.2	46	5	8	17.4
5+	17	0	-	41	20	45	109.8	14	7	12	85.7
	<u>124</u>			<u>279</u>	<u>44</u>	<u>73</u>	<u>26.2</u>	<u>175</u>	<u>19</u>	<u>27</u>	<u>15.4</u>

(1) Patients in Asthma Visit Group

(2) Number of patients admitted during 12-month period

(3) Number of admissions during 12-month period

(4) Admission Rate = Number of admissions during 12-month period
per 100 asthmatic patients in the visit group.

Table 6. Comparative Data for Asthma Patients
in the Medical Plan and Hospital Clinic.

	Medical Plan	Hospital Clinic	
		Medicaid	Non-Medicaid
1. Percentage in high risk group; 5+ acute visits	14%	15%	8%
2. Average number of visits for acute asthma	2.6	2.8	2.3
3. Average number of ER visits for acute asthma	1.0	1.8	1.5
4. Percentage of asthmatic patients visiting ER	50%	75%	69%
5. Admissions for asthma per 100 asthmatic patients	0	26.2	15.4
6. Percentage of asthmatic patients admitted for asthma	0	16%	11%

**Health Care Services for
Children Under Medicaid**

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EXECUTIVE SUMMARY

Medicaid Management Information System (MMIS) Eligibility and Payment files were converted to formats compatible with a database management system, INFORM, developed by one of the authors (E.N.). Calculation of eligibility variables and creation of fixed field records allowed rapid tabulation and analyses of 18 months of children's Medicaid data for the State of Maryland. Descriptive data were assembled and certain suppositions about services and recipients were tested.

In many study calculations of rates the total of all enrollees ever eligible during the study year about 260,000, was used as the denominator. In contrast, for budgetary purposes the Annual report for the Medicaid Program used the monthly average number of enrollees for this purpose, a number about 60,000 less than the ever eligible figure. About 18.5% of the State's childhood population were enrolled in the Program sometime during the study year but 33% failed to receive any Medicaid services. Enrollment was quite high in some areas, e.g. in Baltimore City 27% and for nonwhite children aged 1 through 5 years 86%. Indeed, Medicaid was a very major third party payor for non-white urban populations of children.

A core population of children was identified with extended periods of eligibility amounting to an average duration of about 40 months. By the end of the study period 72,351 children were found to have been continuously eligible for Medicaid for 48 months or longer.

Payments for Medicaid services for children were disproportionately distributed in that 68.6% of annual expenditures were accounted for by 9.3% of all users of services. By age group, payments were highest for the under 1 year old age group identifying the Medicaid Program as a significant payor for fragile or sick low birthweight infants.

Inpatient care occurred more often but was of a shorter duration in rural areas. Length of eligibility was not proportionate to average number of inpatient days suggesting that a costly episode of hospitalization may have brought the child into the Program.

Private physicians were the principal providers of ambulatory care by almost 2 to 1 compared to hospital clinics or Emergency Rooms (ERs). Patients usually returned to the same ambulatory care provider. Across the State ER use was highest where few other alternatives existed in

rural areas. For the total enrolled population 42% failed to receive any Medicaid ambulatory care services during the study year.

Outside of Baltimore City 40% of children visited a private physician as their usual provider of care (UPC) while in the City only 22.8% did so. Average annual total payments for those with an OPD as their UPC were twice that for a private physician as UPC. For the OPD group the inpatient admissions rate was 177 admissions per thousand users while the rate was 116 per thousand users for the latter. Ambulatory care payments for the OPD group were almost twice those for the private physician group.

Total average payments for users of services in a hospital based Title V Children and Youth (C&Y) Project were determined for "single site users" (either the Project Clinic was used or the host hospital ER or inpatient service) and for those who used multiple provider sites in other areas of the City in addition to the C&Y Project. The importance of continuity of care was stressed to patients and parents in the C&Y Project. Payments for multiple site users were more than two-and-a-half times greater than payments for "single site users." If all 7,838 C&Y Medicaid users studied had used the single site a total savings for Medicaid of \$1,437,489 would have been realized.

At the outset of the study year on July 1, 1980 visit fees were significantly increased for private physician office visits. In comparing 6 month before and after periods a 23% increase in office visits was observed while users of office care increased by 13%. Payments per user declined by 7.9% in the "after" period.

Only 21% of enrollees made use of dental services. The availability of dental providers when examined by region appeared not to correlate with the regional proportion of dental users.

EPSDT preventive health services were provided to 5.5% of enrollees in clinics and private offices. Health Department EPSDT screens were not included in MMIS files. Average total payments for EPSDT screened users was about \$325 compared to \$470 for all users.

Extended periods of eligibility appeared to result in a reduced need for health care services as evidenced by reduced payments for care when compared to newly enrolled age mates. A significant reduction in inpatient care was observed in the extended care group.

Asthma was found to be a very costly condition among Medicaid children. In comparisons of asthmatics enrolled in Medicaid and a middle class HMO population inpatient admissions for asthma occurred far more frequently in the Medicaid group. Other measures of severity were similar for the two groups.

Indicator conditions suggested for examining quality of care issues, using data in MMIS files, included tetracycline use in young children, antibiotic use in Upper Respiratory Infections, penicillin use in those with Rheumatic Fever, perinatal morbidity examined in various subpopulations, and audiometric or tympanometric testing after Otitis Media.

These observations suggest that the original implied intent of the MMIS System to serve administrative including billing, planning and even patient care objectives could well be met with the current data sets. However, access to MMIS data both individual over multiple years and to aggregated information must be simplified and facilitated. Of all third party payors Medicaid remains one of the most economical administratively and could well justify increased support for the MMIS.

Postulating that certain patient care information potentially might improve the quality of care concurrent access to MMIS data would be essential. In addition, responding to the implications of the information would require increased case management and outreach services which are normally not available in health care settings, except in some health department or other human services agencies. Given the medical and developmental vulnerability of low income populations expansion of such linkages and services deserves much more attention.

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